OPA EPA Email Correspondence Received from December 8-January 25, 2022

This is a log of emails the Housing team received between January 25, 2022 and March 1, 2022. There were some corrections made to the record that was already posted, therefore, the log begins from the last hearing on January 25, 2022. Also to allow for enough time for staff to transpose all the emails, this log ends with any emails received before 5pm on March 1, 2022. Any emails that are received after publication of this attachment will be acknowledged and documented after the hearing scheduled for March 1, 2022 starting at 6:30pm.

If any correspondence was missed, please email Housing@cityofepa.org. Thank you!

From: martin medina
To: Housing
Subject: no opa..!
Date: Saturday, February 5, 2022 9:47:09 AM

Sent from Mail for Windows

To whom it may concern; I am a property owner in e.p.a. I own 2 homes on jasmine st..i rent them and feel very proud to say that they have worked good for me as they are part of my retirement income..also I am a verymuch hands on landlord and do give my tenants good quality homes…I do not see how opa will benefit me or all the other owners…thank you so much…martin medina..

From:	Carol Cunningham
To:	Ruben Abrica; Lisa Yarbrough-Gauthier; Regina Wallace-Jones; Antonio D. Lopez; Carlos Romero
Cc:	Housing; Jaime Fontes; Rafael Alvarado; Patrick Heisinger; Rachel Horst; nora@draconsultants.com
Subject:	1/25 OPA Discussion and RoFR Studies
Date:	Sunday, February 6, 2022 3:42:40 PM
Attachments:	Professor Bikhchandani Email.pdf RoFR - NYU.pdf RoFR - Harvard.pdf RoFR - Texas A&M, Harvard.pdf RoFR - Natl Taiwan University, University of Iowa.pdf RoFR - Universidad Torcuato Di Tella, Universidad de San Andres.pdf RoFR - UCLA.pdf

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Dear East Palo Alto City Council,

I attended the 1/25 meeting to listen to your discussion on the topic of OPA. I strongly agree with Councilmember Wallace-Jones's statements and am glad that she raised some of the critical questions that many of us are asking as well. I also appreciated that Vice-Mayor Gauthier and Mayor Abrica raised the Right of First Refusal (RoFR) question with DRA, but am dismayed by Ms. Lake-Brown's dismissive response, essentially claiming that she wasn't able to find any applicable analysis. Is this really an acceptable reply from a "nationally recognized" consultant if they've conducted any meaningful research on such a critical issue? Please hold DRA accountable and push them to do their job instead of putting this burden on homeowners!

Ms. Lake-Brown did not even acknowledge any of the research that one of the homeowners has already shared with the City Council and DRA, which included several papers, one of which was written by the UCLA professor who teaches RoFR and also sent an email to you (please refer to the attached documents). Have Staff or DRA read these papers and attempted to contact/interview any of the professors and lawyers who wrote, and/or are referenced in, these papers and have deep knowledge on the subject? There are plenty of studies on this topic and the impact to different markets, including real estate. After spending a little time, I was able to find several additional papers from highly reputable universities that all support the same conclusion: **RoFR creates an advantage for the rightholder (a.k.a. PEP) to the detriment of the seller and 3rd party buyers**. **As a result, buyers will not participate in this market if they can help it because they do have other choices, which reduces demand and depresses home values for all owners, not just absentee owners**.

Not surprisingly, I actually have not found any papers that indicate the market will behave the same regardless of a RoFR condition or that there would be no adverse impact. In fact, they all indicate that the asset, seller and 3rd party buyers bound by RoFR are "encumbered" or burdened, and that great caution must be taken before granting this condition. I assume DRA would be able to locate this information easily and should have access to even more studies than a regular homeowner like myself. However, because they have not done so, I attached these additional papers and included some key excerpts below for your convenience.

1. **RoFR - Harvard:**

- Because the [RoFR] provision deters potential buyers, the right of first refusal is costly for the contracting parties.
- Facing significant search and negotiation costs, a third party is discouraged from bidding against a right of first refusal.
- The reduction in expected gain for the third party created by the right of first refusal

deters the outsider from investing in search and negotiating costs.

- A real estate attorney confirmed that buyers do not want to get involved in bidding on property encumbered by rights of first refusal.
- Rights of first refusal are costly to the contracting parties. At the time of sale a third party may place the highest value on the encumbered property. By reducing a third party's expected gain and thus deterring potential outside bidders, the instrument reduces the seller's realization.
- If the parties simply seek to insure against bargaining breakdown, however, the adoption of a right of first refusal carries too great a cost.
- I have argued that legislatures should be particularly cautious in granting rights of first refusal and should consider requiring paper auctions instead, if the legislative goal is merely to ensure that a certain party has a fair opportunity to bid. We should question the rationale behind legislative decisions that go further and mandate true rights of first refusal.

2. **RoFR - Texas A&M, Harvard:**

- Notice that this form of the right of first refusal (a L-ROFR) gives the right holder an unambiguous benefit, at the cost of efficiency (and of seller revenue).
- Efficiency is hurt even further if the existence of a buyer who holds a L-ROFR leads other potential bidders to stay away from the auction, as it might when bidding is costly.

3. **RoFR- NYU:**

- A right of first refusal is valuable to the rightholder because the right adversely affects the bargaining choices of the seller.
- Uncompensable transaction costs make a right of first refusal more valuable. Uncompensable transaction costs effectively render the subject property unmarketable to a third party buyer.
- The main results are: (i) Rights of first refusal are more valuable than rights of first offer. (ii) If transaction costs are compensable, first purchase rights have the highest value when bargaining skills are relatively evenly distributed. (iii) The fact that transaction costs are uncompensable increases the value of first purchase rights; this increase is more pronounced for a right of first refusal than for a right of first offer.

ALL of the evidence and studies that I've reviewed indicate that RoFR will discourage buyers, which in turn will depress the market for all homeowners. There isn't one scenario that indicates otherwise. If you still don't believe the research, ask yourself if you would spend the time and emotion to research/bid on a home if your offer had to be shared with a PEP so that they could try to match it, and if they could, they would get to purchase the home. Additionally, if you were a buyer, would you consider purchasing in a market where homes could be subject to this condition or would you look in other areas that didn't have this condition? Please note that buyers do have choices other than East Palo Alto if they can't afford Palo Alto or Menlo Park, so East Palo Alto isn't the only "affordable" game in town (e.g. Belle Haven, parts of Redwood City, East Bay, etc). Alternatively, buyers may also choose to leave the area, buy a smaller home (or pool resources together to afford a bigger home) in a more expensive area, or continue renting, so East Palo Alto doesn't have a monopoly on the market of buyers who can't afford neighboring communities.

I also want you to know that I did not initially oppose OPA when I first heard about it through social media. I actually thought it would be a win-win solution that would help

tenants and also give homeowners additional options to sell off-market more easily. It wasn't until I attended the community meeting led by Staff on 12/1 to learn more details that I realized there were fundamental issues with the ordinance that would adversely impact all homeowners. After further due diligence, I learned that there were also other flaws with this ordinance and the way it was drafted, which I (and others) have shared in various formats with you. Now after the 12/22 and 1/25 meetings, and additional meetings with certain Councilmembers and Staff, I'm saddened to reach the conclusion that OPA has turned into a political exercise for supporters based on emotion/ideology and not merit.

As a final note, I was surprised when the Mayor indicated that he felt the issue of RoFR is just a matter of opinion or belief, essentially discrediting all of the research and experts that have written on the subject. I was further stunned when he also admitted that OPA is essentially an experiment, one that would maybe help up to a handful of tenants in a year per Councilmember Romero. Why is the City embarking on an experiment that carries such grave risk/burden for such little (to zero) ROI, using homeowners as the guinea pigs?! To reiterate, no other OPA ordinances include single-family homes, and the areas where OPA has been implemented or are being considered are large, urban centers with a much larger population and a larger variety of housing stock (e.g. San Francisco, Washington DC, Oakland, Berkeley, San Jose, or at the state level). OPA is not a "progressive" solution just because no other city has implemented it in the way it's being proposed for East Palo Alto. It just doesn't make sense in such a small, suburban city where the majority of housing stock are single-family homes. Please don't let East Palo Alto be the subject of reckless experimentation and bad policy! Let's go back to the drawing board with a clear understanding of the problem we're trying to solve in order to develop truly effective solutions. You have the attention and support of an entire community who wants to see East Palo Alto thrive for all residents.

Thank You,

Carol Cunningham
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> open attachments unless you validate the sender and know the content is safe.

From: Bikhchandani, Sushil
To: Ruben Abrica; Lisa Yarbrough-Gauthier; Antonio D. Lopez; Regina Wallace-Jones; Carlos Romero
Cc: Jaime Fontes; Rafael Alvarado; Patrick Heisinger; Rachel Horst
Subject: ROFR provision in Opportunity to Purchase Act
Date: Tuesday, January 11, 2022 10:03:07 AM

Dear Honorable City Councilors of East Palo Alto,

This missive is a comment on the Opportunity to Purchase Act (OPA) which the City Council of East Palo Alto is considering. I am a professor at the Anderson School of Management at UCLA. I have done research on the Right of First Refusal (ROFR). In my classes here at UCLA, I teach issues related to the ROFR.

I hesitate to write this letter because I very much applaud your goal of providing housing for the displaced and homeless in East Palo Alto. My purpose in writing is to point out that in achieving this laudable goal, current homeowners will incur costs in terms of reduced selling prices and appraised values of their homes.

Whether home prices in East Palo Alto decrease or increase after the OPA is implemented in its current form is determined largely by broad economic forces that influence the supply and demand of houses. The key point is that selling prices will be lower if the OPA is implemented with an ROFR provision than if it were implemented without an ROFR. I focus below only on the ROFR and not on any other provision in the OPA.

The primary reason an ROFR lowers prices is that it curtails competition from third-party buyers who are put at a disadvantage. In the absence of an ROFR, when two or more buyers submit bids to buy a house the seller may invite all buyers to submit higher bids – all credible buyers are treated equally. If, instead, one buyer has an ROFR, and this special buyer matches the highest bid made by the other bidders, then there is no further bidding; this results in a lower selling price.

The structure of the real-estate market exacerbates this tendency. This is because the sale of houses is typically intermediated by real-estate agents, whose interests are best served by a quick sale. An agent of a third-party buyer is less likely to show them a property in which another party has an ROFR because the playing field is tilted against the third-party buyer (the agent's client). If the ROFR-holder merely matches the third-party buyer's bid, the agent's client doesn't get the house. As real-estate agents earn a commission only if they close a deal for their client, they will steer their clients away from properties that have a ROFR-holder under the OPA. This would diminish buyer interest and further decrease prices of homes sold under the OPA.

Non-resident homeowners who come under the purview of the OPA will, of course, be directly affected as they will likely obtain a lower price (than they would have if the ROFR provision was not part of the OPA) when they sell their property. Homeowners who are exempt from the OPA will also be adversely affected as the comparison set of houses for appraisal of their home may include homes that were sold under the purview of the OPA.

It is difficult to estimate the magnitude of the negative impact that an ROFR will have on home prices, but it may well be substantial. Allow me to give you an example from another line of business.

In 1994, Wayne Huizenga, the founder of AutoNation and Waste Management Inc., bought the NFL team Miami Dolphins for $138 million. The price was considered very low for a team which in 1994 had the best pro-football record since 1970. At that time, even new NFL expansion teams were being sold at a price greater than $138 million. New England

Patriots had recently been sold for $160 million. Mr. Huizenga, who was a board member of the Miami Dolphins franchise, had an ROFR on any future sale of the team. When the Miami Dolphins was put up for sale, there was very little interest. Potential buyers were not going to take on Mr. Huizenga armed with his ROFR. Only one serious buyer submitted a bid. Mr. Huizenga matched this buyer's bid of $138 million and bought the Miami Dolphins. Because of the ROFR, Miami Dolphins' selling price of $138 million was almost 14% lower than New England Patriots' selling price of $160 million.

Let me reiterate that I support your goal of providing housing options for the under-privileged. My intent is to lay out one of the costs of the OPA as currently written. This cost, in terms of lower sales prices of existing homes, will be borne not just by non-resident homeowners but as mentioned above, also by resident homeowners through the impact on appraisal values of their homes.

Sincerely,
Professor Sushil Bikhchandani
Howard Noble Chair in Management
Anderson School of Management, UCLA
sbikhcha@ad.ucla.edu

P.S. Many years back, I went to graduate school at Stanford University. I have pleasant memories of my time in South Bay.

cc: City Manager
City Attorney
Assistant City Manager
City Housing Manager

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RETHINKING RIGHTS OF FIRST REFUSAL

David I. Walker*

Discussion Paper No. 261

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RETHINKING RIGHTS OF FIRST REFUSAL

David I. Walker*

Abstract

As typically employed, the contract provision known as the right of first refusal provides the grantee with a contingent option to purchase an asset if the grantor elects to sell. Conventional wisdom teaches that rights of first refusal are employed to avoid a costly future breakdown in bargaining between the grantor and the grantee and to guard against a sale to an undesirable party. In this Article I argue that the traditional justification is faulty. Because the provision deters potential buyers, the right of first refusal is costly for the contracting parties, and, if the sole aim of the contracting parties is to eliminate a future breakdown in bargaining, that goal can be achieved at a lower cost by committing to a paper auction. Having rejected the traditional justification, I go on to argue that the real motivation behind the adoption of rights of first refusal, at least in co-venturing relationships, must be a desire to inhibit the unilateral departure of a participant. I also argue that the use of rights of first refusal in other relationships, such as the lessor/lessee relationship, may be explained as an example of suboptimum standardization of contract terms. I conclude with a few thoughts concerning the implication of this analysis for private contracting and for legislatures that are considering mandating rights of first refusal.

JEL Classification: C70, D21, D23, D81, D82, D83, G34, K12.

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RETHINKING RIGHTS OF FIRST REFUSAL

David I. Walker*

Contents

* Law clerk to the Honorable Karen Nelson Moore, United States Court of Appeals for the Sixth Circuit. J.D., Harvard Law School, 1998. A previous version of this Article was awarded the John M. Olin Law and Economics Prize by Harvard Law School. I thank the prize committee for their support and, in particular, Lucian Bebchuk, who provided the inspiration for this work as well as many helpful comments.

INTRODUCTION

Among the many provisions of the incorporating documents of a close corporation, an item will often appear (usually well towards the back) labeled "Rights of First Refusal." By adopting this provision, the shareholders of the corporation promise that they only will sell their shares after negotiating a price with a third party and offering the shares at that price to their fellow shareholders. Although the details will vary, such rights of first refusal are ubiquitous in commercial contracts and encumber assets ranging from gas stations to oil pipelines, from shares of stock to livestock; and they are not limited to constraining sales or even to restricting the disposition of property.[1]

In the typical right of first refusal arrangement, at least three parties are implicated -- the owner and rightholder who have contracted for the grant of the right and one or more potential third-party buyers. This Article investigates the economic impact of the grant on each of these parties, and seeks to determine why the contracting parties make such commitments and why they adopt this particular instrument.

This Article has three primary goals:

1. Demonstrate that rights of first refusal are costly for the contracting parties.

The few commentators who have considered the matter have suggested that rights of first refusal are economically innocuous[2] or, beyond transaction costs, simply transfer value from the

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[1] *See infra* Part I.A-B.

[2] *See, e.g.*, 3 ERIC MILLS HOLMES, CORBIN ON CONTRACTS § 11.3, at 484-85 (Joseph M. Perillo ed., rev. ed. 1996) [hereinafter CORBIN] (a contract that grants a right of first refusal "for a definite period operates very little, if any, as a restraint on alienation by [the owner]. . . . Rather

grantor to the rightholder.[3] If, at worst, a right of first refusal simply transferred value between the contracting parties, little justification would be needed for its adoption. The transfer could be compensated for ex ante, if necessary, and the benefit beyond transaction costs arising from the instrument would represent added value to be divided by the contracting parties. My first goal,

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than restraining alienation, the right enhances it by providing two buyers when property is sought to be sold.").

[3]Marcel Kahan has analyzed the economics of rights of first refusal and the magnitude of the value transfer from the grantor to the rightholder. He suggests that negotiation and dispute costs detract from a zero-sum transfer between the parties to the contract. *See* Marcel Kahan, An Economic Analysis of Rights of First Refusal (July 1997) (unpublished manuscript, on file with author).

The literature on rights of first refusal is not extensive. Professor Kahan's piece is the only in depth economic analysis of the instrument of which I am aware. The most extensive doctrinal treatment is provided by CORBIN, *supra* note 2, §§ 11.3-.4. *See also* 1 E. ALLAN FARNSWORTH, FARNSWORTH ON CONTRACTS § 3.23a (2d ed. 1990); 1 SAMUEL WILLISTON, A TREATISE ON THE LAW OF CONTRACTS § 4:25 (Richard A. Lord ed., 4th ed. 1990). In the close corporation setting, see F. HODGE O'NEAL & ROBERT B. THOMPSON, O'NEAL'S CLOSE CORPORATIONS §§ 7.01-.48 (3d ed. 1996), for a description of the need for, history, and use of stock transfer restrictions, in general, and rights of first refusal, in particular. This treatment is extensive and practical. The use of rights of first refusal in the close corporation is examined from an economic perspective in FRANK H. EASTERBROOK & DANIEL R. FISCHEL, THE ECONOMIC STRUCTURE OF CORPORATE LAW 228-32 (1991) and ROBERT C. CLARK, CORPORATE LAW 763-65 (1986).

Legislative grants of rights of first refusal have been the subject of a number of articles. Those germane to this Article include Bernard V. Keenan, *Condominium Conversion of Residential Rental Units: A Proposal for State Regulation and a Model Act*, 20 U. MICH. J.L. REF. 639; Thomas J. Houser, Note, *A Comparative Study of the Former Owner's Right of First Refusal Upon a Lender's Resale of Foreclosed Agricultural Land: A New Form of State Mortgagor Relief Legislation*, 13 J. CORP. L. 895; and Robert M. Lawless, Note, *The American Response to Farm Crises: Procedural Debtor Relief*, 1988 U. ILL. L. REV. 1037. Finally, a handful of cases move beyond doctrinal basics to analyze the purposes and implications of rights of first refusal. *See* Pincus v. Pabst Brewing Co., 893 F.2d 1544 (7th Cir. 1990) (examining the creation and triggering of a right of first refusal on the sale of a subsidiary); LIN Broadcasting Corp. v. Metromedia, Inc., 542 N.E.2d 629 (N.Y. 1989) (determining that a right of first refusal is not converted into an option by an owner's offer to sell); American Broadcasting Cos. v. Wolf, 430 N.Y.S.2d 275 (N.Y. App. Div.), *appeal dismissed*, 413 N.E.2d 1173 (N.Y. 1980), *aff'd*, 420 N.E.2d 363 (N.Y. 1981) (focusing on the appropriate damages for the breach of a right of first refusal on the services of an employee).

however, is to demonstrate that parties adopting rights of first refusal incur more than dispute and negotiation costs. Rights of first refusal discourage potentially high-valuing third-party bidders from entering a contest to purchase, and thus the instrument reduces a seller's expected realization. For this reason the right of first refusal proves to be costly for the contracting parties, in aggregate.

2. Rebut the idea that rights of first refusal provide efficient insurance against bargaining breakdown.

Although the right of first refusal is demonstrated to create a net cost for the contracting parties, the right does provide benefits. Several books and articles dealing with rights of first refusal in the close corporation context suggest that the device is used to assure compatible management, maintain family control, or otherwise protect the remaining shareholders from an interloper.[4] The existence of such goals, however, explains only why an insider might value property, in this case shares, more highly than an outsider would; it does not explain why the encumbrance is necessary. Presumably, if the insider places the highest value on shares or other property, he will buy them when they are offered for sale. Underlying this rationale, then, must be a further argument about bargaining breakdown. Fully spelled out, the argument is that an insider may place a high idiosyncratic value on a property and that, absent the insurance provided by a right of first refusal, such value could be lost in a failed negotiation.[5]

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[4] *See* EASTERBROOK & FISCHEL, *supra* note 3, at 228-29; O'NEAL & THOMPSON, *supra* note 3, § 7.02; Joseph Jude Norton, *Adjustment and Protection of Shareholder Interests in the Closely-Held Corporation in Texas,* 39 SW. L. J. 781, 804. These arguments are described more fully *infra* Part III.A.

[5] This argument is advanced in Kahan, *supra* note 3, and is more fully developed *infra* Part III.

Although helpful, the bargaining-breakdown explanation is not fully persuasive. The second aim of this Article is to rebut this justification by demonstrating that equally effective insurance against bargaining breakdown can be provided at lower cost through an instrument that I call a commitment to auction.

3. Suggest that rights of first refusal are primarily motivated by a desire to inhibit exit.

Having rejected the bargaining-breakdown-insurance hypothesis as inadequate, my third goal is to develop alternative explanations for the persistence of rights of first refusal. I argue that most rights of first refusal spring from a desire not just to ensure that, if *A* sells, *B* gets an opportunity to purchase the property, but from a desire to inhibit *A* from selling in the first place. In other words, the selection of the right of first refusal over the commitment to auction must be explained by a desire to restrain alienability and preserve the status quo. Although credible in the context of close corporations and other co-venturing relationships, this justification does not make sense in all circumstances in which the right of first refusal is adopted. In contexts in which inhibiting exit is an unpersuasive justification, however, the right of first refusal generally carries a lower incremental cost, and the instrument's persistence may be partially explained by network externalities.

Part I describes the uses of rights of first refusal, their variations, and alternatives, as well as the assets typically encumbered and the participants usually involved. Because the terminology associated with these restrictive devices is not used consistently, one of the purposes of this Part is to closely identify the "true" right of first refusal that will be the focus of this Article. Part II analyses the cost of the right of first refusal grant. In this Part, I argue that contracting parties who encumber assets with rights of first refusal reduce the expected gains of

third parties considering bidding on the assets. This phenomenon, I argue, deters bidders and reduces the expected realization on the sale of such property.

Part III develops the bargaining-breakdown justification. I argue that the potential for high insider idiosyncratic value in relationships in which rights of first refusal are typically found make these relationships particularly susceptible to bargaining breakdown. This finding, however, only justifies the provision of some insurance; it does not necessarily support the creation of a right of first refusal. Accordingly, Part IV undercuts this justification as it demonstrates that the adoption of a commitment to auction the encumbered property provides the same insurance at a lower cost. Like a right of first refusal, a commitment to auction avoids the possibility of lost insider idiosyncratic value through failed negotiations, but third-party bidders and, thus, the expected realization on the sale of the property are not as adversely affected by the use of the auction device.[6]

The close corporation model is the focus of Part V. There, I argue that co-venturers often would wish to inhibit the exit of members as well as to veto new additions, and that the relatively harmless-looking right of first refusal has become the legally acceptable tool of choice for achieving this goal. Part VI, however, suggests that inhibition of exit does not adequately explain all rights of first refusal, and this Part develops other explanations, chiefly network

[6]This statement highlights the quandary faced by the parties considering the adoption of a right of first refusal. The contract that may incorporate such a right is often written years or decades before a sale is contemplated. At the time of contract formation the parties cannot know whether at the time of sale the rightholder or a third party will place the higher value on the property, but in order to maximize the pie the contracting parties must be concerned about both scenarios.

Although an arbitrary result of utilizing the right of first refusal as a baseline, throughout this Article the potential loss of higher third-party value is considered a cost to the contracting parties, while the retention of high insider value is considered a benefit.

externalities, to fill the gap. The implications of the analysis are briefly reviewed in Part VII. Given the presumption of efficient contracting in the private sector, the focus of this Part is on statutory grants of rights of first refusal.

I. A DESCRIPTION OF RIGHT OF FIRST REFUSAL PRACTICE

This Part describes the right of first refusal in very general terms, distinguishes the instrument from an option, and touches upon several alternative instruments. The range of assets encumbered, the participants involved, and the sources of the right also are described.[7]

A. An Overview of the Right of First Refusal, Variations, and Alternatives

1. A Typical Right of First Refusal. The following arrangement is typical of the classic right of first refusal: The owner and lessor of a property grants to the lessee a right to match the terms of and preempt any sale of the property negotiated between the owner and a potential third-party buyer during the term of the lease. This preemption right essentially allows the lessee to step into the shoes of the potential buyer and make the purchase. If, after receipt of notice and within a specified time, the lessee elects not to exercise the right, the owner and third-party buyer have a fixed term in which to execute the transaction. If the lessee elects not to exercise and, for some reason, the sale is not consummated with the third party or is not completed within the specified period, the right of first refusal is reactivated and the lessee must again be given notice and the right to preempt before the property may be sold. Because the right of first refusal could be circumvented by the owner's negotiation of a swap of the property for a unique property

[7]For further description and analysis of rights of first refusal, see CORBIN, *supra* note 2, § 11.3. A large number of cases involving garden-variety rights of first refusal are collected in this reference. In the descriptions that follow I have limited my citations to the more unusual applications of the instrument.

owned by the third-party buyer, the contract providing the right of first refusal grant often will confine the owner to negotiating a sale for cash.

The right of first refusal device apparently serves two purposes. First, it provides some security to the lessee. Although the sale of the property would not disrupt the lease, the lessee may care about the identity of his lessor. Under this arrangement, if the owner decides to sell, the lessee will at least be given the opportunity to purchase. Second, although the right of first refusal may restrict the owner, she is not locked in to ownership of the asset for the full term of the lease.

2. Diversity in Right of First Refusal Terms. A "right of first refusal" is simply a fancy name for a small bundle of contract terms. As such, the applications and variations of the right are seemingly infinite. In contrast to the grant of a right to purchase, the right of first refusal may be used to grant a preemptive right to sell,[8] a right to lease,[9] a right to employ,[10] or a right to be employed.[11] The right of first refusal may be granted for a limited duration, as in the right to preemptively purchase during the term of a lease, or, subject only to certain rules barring perpetuities, the right may be perpetual, as in the case of a shareholders' agreement that grants a

[8]*See, e.g.,* Hyperbaric Oxygen Therapy Sys., Inc. v. St. Joseph Medical Ctr. of Fort Wayne, Inc., 683 N.E.2d 243 (Ind. Ct. App. 1997) (right of first refusal to sell medical equipment).

[9]*See, e.g.,* Ellwest Stereo Theaters, Inc. v. Davilla, 436 So. 2d 1285 (La. Ct. App. 1983) (right of first refusal to lease commercial property).

[10]*See, e.g.,* American Broadcasting Cos. v. Wolf, 430 N.Y.S.2d 275 (N.Y. App. Div.), *appeal dismissed,* 413 N.E.2d 1173 (N.Y. 1980), *aff'd,* 420 N.E.2d 363 (N.Y. 1981) (right of first refusal on services of sportscaster).

[11]*See, e.g.,* Russell v. District of Columbia, 747 F. Supp. 72 (D.D.C. 1990), *aff'd,* 984 F.2d 1255 (D.C. Cir. 1995) (hospital employees given right of first refusal on other positions within the District).

close corporation a right of first refusal on any sale of shares by the shareholders. Generally, the right of first refusal is granted as one element of a larger transaction -- in my first example the right of first refusal was incidental to the lease of property. It is conceivable, however, that parties might contract solely for the grant of the right of first refusal.

3. Fixed Price Rights of First Refusal. In my example involving the right of first refusal held by the lessee, the contract specified that the right to preempt would be at the price negotiated between the owner and the third-party buyer. This, indeed, is the standard approach adopted by contracting parties, and it is an intuitively appealing arrangement, as the owner is required to develop an executable deal and the price is assumed to be at or near market. An alternative to this arrangement is the grant of a right of first refusal at a fixed price. Although rarely seen today, some contracts have specified that if the grantor chose to sell parcel *X* within a certain period, the grantee would have the right to purchase the parcel for $*Y*.[12] Because a parcel would undoubtedly be worth something other than $*Y* at the time a right is triggered, such a grant generally would either be worthless to the grantee (when the market price is below $*Y*) or would prevent the grantor from selling or cause her considerable loss if forced to sell (when the market price is above $*Y*). Thus, the rarity of this variation is not surprising.

4. Distinguishing Rights of First Refusal from Options. Although often associated with options, the right of first refusal is not a true option. The holder of an option to purchase, for instance, has a unilateral right to trigger the purchase at the option price during the term of the

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[12]*See, e.g.*, Smith v. Estate of La Tray, 555 N.Y.S.2d 968 (N.Y. App. Div. 1990).

option.[13] The holder of the right of first refusal, by contrast, has only a contingent option. Contingent upon the grantor's decision to sell, the right of first refusal grantee has an option to purchase.[14]

5. Alternatives to the Right of First Refusal. The right of first refusal is a means of dealing with foreseeable, but unpredictable, changes in business relationships. The option, discussed above, is an alternative mechanism for managing a changeable environment, and the right of first offer is another. The right of first offer is essentially a right of first refusal in reverse. Its use can be demonstrated by substituting a right of first offer for the right of first refusal in the lease example: The lessor grants the lessee a right of first offer. If the lessor decides to sell the property during the term of the lease, perhaps after preliminary discussions with potential buyers, the lessee will be given notice and a specified period during which to make an offer to purchase. The owner may accept the offer or may, within a specified period, sell to a

[13]Generally an option price is fixed or is objectively determinable by reference to a public market.

[14]One frequently litigated question, although not one of importance to this analysis, is whether, assuming that the contract is silent on this point, the delivery of notice to the right of first refusal grantee triggers a unilateral right to preempt during the term allotted for exercise of the right, in other words, whether the right of first refusal matures into an actual option for the exercise period, or whether the grantor may change her mind and revoke the "option" during the exercise period if the grantee has not yet noticed his intention to preempt. The case results on this question are mixed. *Compare* CORBIN, *supra* note 2, § 11.3, at 470-71 (The "owner's receipt of an offer and the good-faith decision to accept it . . . 'triggers' the right of first refusal that 'ripens' into an option. The option then can be exercised like any other option contract.") *with* LIN Broadcasting Corp. v. Metromedia, Inc., 542 N.E.2d 629, 633-35 (N.Y. 1989) (the right of first refusal is not converted into an option by the owner's offer to sell and may be revoked prior to acceptance by the rightholder).

It is important to recognize that the labels applied by the parties do not always mirror the economic reality of the instruments involved. A true option that gives the holder a unilateral right to trigger is often labeled a right of first refusal, while a true right of first refusal that grants the holder only a contingent option is sometimes called a first option.

third party. However, the owner may not sell to a third party for a price less than that offered by the lessee.[15]

Another alternative to employing a right of first refusal is the adoption of a commitment to negotiate. Often seen in the employment context, the commitment to negotiate specifies a period during which each party to the contract commits to negotiate exclusively with the other(s) and in good faith. If time is critical, the existence of an exclusive negotiating period puts some pressure on the parties to reach agreement. The value of an entertainer whose services are so encumbered, for example, may be eroded if he is kept off the market for several months. Property transactions, however, often are less time sensitive, and a commitment to negotiate may only defer a transaction with a third party at nominal cost to the owner.

B. Assets Encumbered by Rights of First Refusal

1. Real Property. Real property may be the most common subject of rights of first refusal.[16] A survey of right of first refusal cases litigated in any year will reveal that the large majority involves undeveloped land, residential property, or commercial property. Moreover, almost all of these cases will involve the grant of a preemptive right to purchase (as opposed to a right to lease, or a right to sell). The range of commercial assets encumbered by rights of first refusal is quite diverse. Commercial assets involved in litigated cases from 1990, for instance,

[15]A further variation on this arrangement is a right of first offer at an appraised price. Under this scheme, an owner wishing to sell must have the property appraised and must provide the rightholder an opportunity to purchase at the appraised price. If the rightholder declines, the owner may proceed to sell the property unencumbered. As in the case of options, true rights of first offer are occasionally labeled rights of first refusal. One must look beyond the label to the economic reality to accurately classify and analyze the instrument.

[16]*See* CORBIN, *supra* note 2, § 11.3, at 469.

included an automotive repair shop,[17] a hardware store,[18] a gasoline service station,[19] an oil storage terminal,[20] and a natural gas pipeline.[21]

2. Securities. Another important category of encumbered assets is corporate securities, and, in particular, the shares held by the owners of close corporations. Typically, the close corporation charter or bylaws will provide that the corporation and/or other shareholders will have a right of first refusal on the sale of any shares by any owner. Although these arrangements rarely result in litigation, it has been reported that over half of U.S. corporations restrict the transfer of shares[22] and that "option" agreements, including rights of first refusal, are the most common transfer restriction.[23] Occasionally cases involving securities arise outside of the close corporation shareholder context. In one notable case a large firm granted a key manager a right of first refusal on the shares of a subsidiary corporation.[24]

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[17]*See* Roy v. George W. Greene, Inc., 563 N.E.2d 215 (Mass. 1990).

[18]*See* Stone v. W. E. Aubuchon Co., 562 N.E.2d 852 (Mass. App. Ct. 1990).

[19]*See* Dege v. Milford, 574 A.2d 288 (D.C. 1990).

[20]*See* Koch Indus., Inc. v. Sun Co., 918 F.2d 1203 (5th Cir. 1990).

[21]*See* West Tex. Transmission, L.P. v. Enron Corp., 907 F.2d 1554 (5th Cir. 1990), *cert denied*, 499 U.S. 906 (1991).

[22]*See* O'NEAL & THOMPSON, *supra* note 3, § 7.02.

[23]*See* i*d*. § 7.05.

[24]*See* Pincus v. Pabst Brewing Co., 893 F.2d 1544 (7th Cir. 1990).

3. Commercial Products. Commercial products, such as the weekly or monthly production from a chemical plant, are occasionally subjected to rights of first refusal.[25] The price terms in such agreements may be fixed, and, given the immediacy of sale[26] and the fact that the grantee knows roughly when the owner will be selling, such rights of first refusal resemble traditional options.

4. Employment. The term "right of first refusal" also is used in employment contracts. Typically, the employee and employer will agree to a fixed-term contract. In addition, the contract will provide that for a certain term beyond the expiration of the contract, perhaps three months, the employer will have a right of first refusal to match any offer agreed to for future employment between the employee and another employer. Often the right of first refusal is accompanied by a commitment between the employee and employer to negotiate in good faith during that three-month term or for some lesser period. If the employee has decided she would prefer to work elsewhere, however, the right of first refusal in this situation simply serves as a non-compete clause for its duration.[27]

C. Participants in Right of First Refusal Agreements

1. Co-Venturers. Right of first refusal agreements can be classified as reciprocal or unilateral depending on the relationship between the participants. Co-venturers often create agreements in which each participant reciprocally grants and receives first-refusal rights to and

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[25]*See, e.g.*, Madison Indus., Inc. v. Eastman Kodak Co., 581 A.2d 85 (N.J. Super. Ct. App. Div. 1990).

[26]Normally the owner's storage capacity will be limited and regular offtake will be necessary.

[27]*See, e.g.*, American Broadcasting Cos. v. Wolf, 430 N.Y.S.2d 275 (N.Y. App. Div.), *appeal dismissed*, 413 N.E.2d 1173 (N.Y. 1980), *aff'd*, 420 N.E.2d 363 (N.Y. 1981).

from the others. The close corporation example noted above is typical and demonstrates that the organization may *also* hold rights or it may hold rights *instead* of the participants. In either case, however, the grants are roughly reciprocal. A corporate entity is by no means necessary to generate a reciprocal grant of first-refusal rights, however. Co-owners of land, a building, or even a horse may grant reciprocal rights of first refusal without a corporate or even a partnership structure.[28] Depending on the agreement, or a court's interpretation if the agreement is lacking, these rights may run with the asset and be transferable, or they may be personal rights that vanish on transfer.[29] In the close corporation context, the rights are usually specified in the charter or bylaws and are perpetual. Therefore, if shares are sold to a third party, the new co-venturer will be in the same position with regard to rights of first refusal as was her predecessor.[30]

2. Unilateral Rights of First Refusal. The lessor/lessee example that began this Part is a good example of a one-way or unilateral grant of a right of first refusal. Such unilateral grants are typically seen in lease and franchise agreements, in agreements between different classes of security holders of a corporation, in agreements between employers and employees, and in

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[28]*See* Guggenheim v. Commissioner, 46 T.C. 559 (1966) (undivided ownership interests in a thoroughbred racehorse subjected to rights of first refusal).

[29]*Compare* Sherwood Ford, Inc. v. Ford Motor Co., 860 F. Supp. 659 (E.D. Mo. 1994) (under Missouri law, right of first refusal is a covenant that runs with the land) *with* Todd v. United States, 617 F. Supp. 253 (W.D. Pa. 1985) (covenant granting individuals right of first refusal was personal and terminated on their deaths). Occasionally, rights of first refusal that run with an asset are held to violate the rule against perpetuities. *See, e.g.*, Adler v. Simpson, 610 N.Y.S.2d 351 (N.Y. App. Div. 1994).

[30]If rights of first refusal are codified in a shareholders' agreement in addition to or in place of codification in the charter or bylaws, that agreement should provide for new shareholders to become parties to the agreement after valid transfers occur. *See* O'NEAL & THOMPSON, *supra* note 3 § 7.35.

agreements between product producers and purchasers. In the lease and franchise case, the right of first refusal generally will run only for the lease or franchise term. The employment right of first refusal, as noted above, typically extends only for a short period beyond the length of the employment contract, and the producer/purchaser arrangement also is normally short term. The grant of a right of first refusal by one class of security holders to another exemplifies an instance in which a unilateral right of first refusal may be long-running.

D. Sources of First Refusal Rights

Thus far, each right of first refusal example discussed has arisen by way of agreement between the parties, and contract is the primary source of first refusal rights. Increasingly, however, first-refusal or similar rights are being created by statute. Such rights are frequently litigated, and the statutory grant of first-refusal rights raises several concerns that will be addressed subsequently. For present purposes it is enough to outline the workings of several typical statutes:

The Petroleum Marketing Practices Act[31] regulates the termination of service station franchises and provides that a distributor wishing not to renew a franchise agreement in order to sell the premises first must offer to sell the station to the franchisee or offer the franchisee a right of first refusal on the third-party purchaser's offer. A Florida statute requires an owner of a mobile home park who wishes to offer the park for public sale to provide the homeowners' association a right of first refusal.[32] A number of states have enacted statutes requiring apartment building owners who wish to convert to condominium status to offer the units to the tenants in

[31] 15 U.S.C. § 2802 (1997).

[32] *See* FLA. STAT. ANN. § 723.071 (West 1997).

advance and, if a tenant declines to purchase, forbidding the owner from selling that unit for a lower price for a specified period.[33] Finally, a number of midwestern states have passed statutes that provide the former owner of a foreclosed farm a right of first refusal on the subsequent sale of the farm by a lending institution.[34]

II. THE IMPACT OF THE RIGHT OF FIRST REFUSAL ON NEGOTIATION AND VALUE -- WHY THE INSTRUMENT IS COSTLY FOR THE CONTRACTING PARTIES

The previous Part has suggested and Part III will demonstrate more rigorously that a right of first refusal provides value to the parties creating it. If, as it is sometimes implied, the grant costs the contracting parties little or nothing and simply involves a transfer from grantor to grantee, then the instrument would be unambiguously valuable. This Part demonstrates, however, that the parties to the right of first refusal do incur a joint cost. In providing for the right, the contracting parties decrease the expected realization from the sale of the property.

Section A briefly reviews the literature on this subject and finds that little attention has been paid to the net cost of rights of first refusal. Section B introduces the economic analysis by discussing the search and negotiation costs that a third party considering making a bid for a property must weigh against his expected gain on the purchase, as well as other factors that affect the third party's willingness to bid against a right of first refusal. Section C compares the negotiating dynamics with and without the right of first refusal and demonstrates that a third party's expected gain from bidding is reduced by the encumbrance. Section D explains that the

[33] *See, e.g.*, VA. CODE ANN. § 55-79.94 (Michie 1997).

[34] *See, e.g.*, IOWA CODE ANN. § 654.16 (West 1997).

impact on potential bidders translates into reduced expected value for the parties to the right of first refusal contract.

A. The Literature on the Costs of Rights of First Refusal

To my knowledge no one has conducted an economic analysis of the right of first refusal that fully considers the impact on all of the parties to the transaction. Marcel Kahan has analyzed the transfer of wealth from the grantor to the rightholder, but he did not evaluate the net cost to the contracting parties that follows from the instrument's deterrence of potential third-party bidders. Kahan did, however, suggest that right of first refusal agreements produce negotiating, drafting, and dispute related costs.[35]

Other commentary and cases dealing with the subject recognize that the right of first refusal is a valuable and enforceable right of the grantee[36] that must be supported by consideration.[37] However, these sources do not consider whether the value to the rightholder is offset equally, or more, or less, by the cost to the grantor. If anything, the commentators tend to de-emphasize the significance of the right of first refusal.[38] Farnsworth notes that the right of

[35]*See* Kahan, *supra* note 3.

[36]*See, e.g.*, American Broadcasting Cos. v. Wolf, 430 N.Y.S.2d 275, 281 (N.Y. App. Div.), *appeal dismissed*, 413 N.E.2d 1173 (N.Y. 1980), *aff'd*, 420 N.E.2d 363 (N.Y. 1981) (A right of first refusal is a "valuable right which has enjoyed the protection of the courts.").

[37]*See, e.g.*, FARNSWORTH, *supra* note 3, at 288.

[38]Exceptions to this rule are seen principally in articles questioning the wisdom of statutory grants of rights of first refusal. See, for example, Lawless, *supra* note 3, at 1063-65, in which the author argues that statutes granting farmers rights of first refusal on foreclosed farm property will, like other procedural debtor relief measures, raise interest rates and tighten credit for farmers generally. This situation, however, involves a nonconsensual transfer, and the author's point is not to determine whether the cost to the creditor is offset by the gain to the debtor. In the past courts have occasionally invalidated rights of first refusal as unreasonable

first refusal is less advantageous to the holder than an option because the right of first refusal cannot be unilaterally exercised.[39] Corbin states that in comparison with the grant of an option, a right of first refusal, at least for a definite period, "operates very little, if any, as a restraint on alienation by [the owner]. . . . Rather than restraining alienation, the right enhances it by providing two buyers when property is sought to be sold."[40] We will see, however, that this characterization of the right of first refusal as innocuous or even pro-alienation is far from accurate.

B. Factors Affecting an Outsider's Willingness to Bid Against a Right of First Refusal

A third party considering making a bid for a property offered for sale weighs the expected payoff -- the probability of success and gain from a successful bid -- against the costs involved in making that bid. As will be demonstrated below, the introduction of a right of first refusal adversely affects the third party's expected payoff. The costs faced by the third party are not seriously impacted by the existence of the right of first refusal, but these costs do relate to the relative uniqueness of the property in question. The uniqueness of the property also may have an impact on an insider's informational advantage and the possibility of insider idiosyncratic value, both of which impact the third party's expected payoff. This Section merely introduces the

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restraints on alienation. *See* notes 109-10 *infra* and accompanying text. Obviously these courts did not believe the right of first refusal to be insignificant.

[39]*See* FARNSWORTH, *supra* note 3, at 288. *See also* Pincus v. Pabst Brewing Co., 893 F.2d 1544, 1549 (7th Cir. 1990) ("[A] binding right of first refusal can be a powerful instrument. Yet a right of first refusal to buy something is more contingent than an option to buy the same thing and is therefore less valuable.").

[40]CORBIN, *supra* note 2, § 11.3 at 484-85.

factors affecting an outsider's willingness to bid against a right of first refusal. Their influence will be felt throughout the balance of this Article.

1. Search and Negotiation Costs.[41] A potential buyer alerted to an opportunity to purchase an asset faces several costs. First, the purchaser must collect information and evaluate the merits of the asset in order to arrive at a valuation. These costs are commonly referred to as search costs. Second, the buyer incurs negotiation costs in attempting to reach agreement with the seller. Together, these search and negotiation costs constitute a portion of the buyer's transaction costs. Obviously if the buyer is successful there will be other transaction costs, but for my purposes it is sufficient to focus upon the buyer's search and negotiation costs. In deciding whether to enter the fray, a potential buyer will weigh her estimate of the search and negotiation costs against her estimate of the potential gain from the purchase. Although costs incurred become sunk as the process continues, the buyer will continue to evaluate the estimated future costs and gains and may at any time withdraw from the contest.

The buyer's search costs are related to the pricing transparency and fungibility of the property. Widely traded, publicly held securities are costlessly valued by looking at the market. An undeveloped plot of city property or a standard apartment building may be valued relatively quickly and cheaply. However, a unique commercial property or an unusual piece of land may be more difficult and costly to value, while the shares of a closely held, thinly traded corporation will be very difficult and costly to value.

[41]The impact of the cost of search and expected gains on the optimum level of consumer search is discussed generally in EDWIN MANSFIELD, MICROECONOMICS THEORY/APPLICATIONS 112 (5th ed. 1985).

The wider variation in the potential valuation of unique property also raises the expected negotiation costs of the outside buyer. Again, it takes very little time for a seller and buyer to reach terms on the sale of publicly traded stock, whereas the simple act of negotiation will be costly with regard to thinly traded close corporation shares.

2. Insider Idiosyncratic Value. In almost every case in which a right of first refusal exists, the potential outside buyer should recognize that an insider may place idiosyncratic value on the property. In the close corporation context, for example, the insiders may value maintaining family ownership and control,[42] while the lessee of a building faces relocation costs and loss of goodwill if ousted by a new owner at the end of the current lease. The uncertainty created by the specter of potential insider idiosyncratic value reduces the outsider's expected payoff and generally lowers an outsider's interest.

Intuition suggests that the potential for idiosyncratic value correlates roughly with uniqueness. Close corporation shares are quite unique and have a high potential for insider idiosyncratic value. Commercial property tends to be less unique and generally carries less idiosyncratic value.[43]

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[42]Factors contributing to idiosyncratic value for the insiders of a close corporation are discussed in EASTERBROOK & FISCHEL, *supra* note 3, at 228-29; O'NEAL & THOMPSON, *supra* note 3, § 7.02; and Norton, *supra* note 4, at 804. These factors are discussed more fully *infra* Part III.A.

[43]Relocation costs and loss of goodwill create idiosyncratic value for the lessee of even the most fungible property. Where these effects are significant, however, one would expect the lessee to protect that value through options to extend the lease, as rights of first refusal alone provide no security against termination at the end of the lease. Renewal options would be enforceable against a successor landlord, of course. In any event, although insider idiosyncratic value is an important element of the analysis, it is not critical whether the incidence of such value is random or correlates with uniqueness.

3. Insider Informational Advantage. In a bidding competition between an outsider and an insider, the insider generally will have a significant informational advantage. The magnitude of this advantage relates to the fungibility and transparency of the property. For example, the close corporation participant has much better information with which to evaluate the shares offered by his departing partner. Even if disclosure to the third party is exhaustive, the insider's feel for the firm puts him at an advantage.[44] By contrast, the co-owner of a share of Microsoft has no advantage over an outside bidder, and the co-owner of a fungible piece of real estate has only a limited information advantage.

The existence of an insider with an informational advantage affects the outsider's expected return and willingness to enter the bidding. If the better informed insider knows that the true property value is higher than the outsider believes, the insider will tend to buy. In the reverse situation, the insider will refrain. The net result should be that the informationally disadvantaged outsider tends to succeed when true value is low and to fail when true value is high.[45]

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[44]This advantage is similar to that enjoyed by the insider of a public corporation trading in his own stock. Even if the insider refrains from trading on material, nonpublic information, he still may profit by trading on "diffuse insight into business prospects." *See* Reinier Kraakman, *The Legal Theory of Insider Trading in the United States*, in EUROPEAN INSIDER DEALING: LAW AND PRACTICE 40, 48 (Klaus J. Hopt & Eddy Wymeersch eds., 1991).

[45]The outsider's position in this situation is analogous to that of an honest player in a dishonest card game or, as some have argued, to that of an uninformed shareholder trading in a market dominated by insiders trading on material, nonpublic information. *See id*. at 49 ("insider trading reduces the effective return on [outsiders'] investments"). Even in the absence of an inside contestant, an outside bidder faces an information disadvantage in dealing with an opportunistic seller of unique property in an isolated negotiation. The knowledgeable seller may opportunistically choose to sell bad assets and retain good ones, and the outside buyer can not distinguish as effectively between the two. The difference in the right of first refusal context is that generally the seller can assure the outsider that he is selling for external reasons, rather than

In sum, the expected search and negotiation costs faced by the outsider are greater with respect to unique property as is the outsider's information disadvantage relative to competing inside bidders. At the same time the higher variance in potential value causes the outsider's return to be less certain. Given the additional possibility of insider idiosyncratic value, the outside bidder faces serious obstacles to winning a contest to purchase relatively unique property, even if no right of first refusal exists. [46]

C. The Impact of a Right of First Refusal on Negotiation Strategy and Outcome

In this Section, I focus on the options available to and the optimal strategy selected by a third party who is bidding on property encumbered by a right of first refusal. In so doing, I compare that position to the one that would be enjoyed by such a bidder were the property unencumbered, and I examine the outcomes for each party to the negotiations. At this stage, for simplicity, I assume that the seller of an unencumbered property would auction that property to the highest bidder. I demonstrate that the direct result of the encumbrance is to reduce the third party's expected gain from bidding.[47]

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simply disposing of lemons. *See generally* George A. Akerlof, *The Market for "Lemons": Quality Uncertainty and the Market Mechanism*, 84 Q. J. FIN. 488-500 (1970).

[46]The number of competing outside bidders also has an impact on any particular third party's willingness to enter the competition. More importantly for my analysis, however, we will see in the following sections that the number of potentially interested third-party buyers has an important effect on bidding dynamics and the contracting parties' decision to create a right of first refusal. Although many elements, including price, influence the level of outside interest, all else being equal, generally there will be fewer outside buyers interested in non-fungible, non-transparent property.

[47]For general insight into negotiation strategy and optimization, see HOWARD RAIFFA, THE ART AND SCIENCE OF NEGOTIATION (1982).

1. A First Cut. Suppose the owner of an encumbered property desires to dispose of his property to either the holder of a right of first refusal (the rightholder) or a single third-party buyer (the bidder). Assume that the seller must sell the property, so that the seller's reservation price does not come into play. Suppose that the bidder suspects that the value placed on the property by the rightholder, V_{RH}, is near the value placed on the property by the bidder, V_B.[48] Under the terms of the right of first refusal, the bidder must negotiate a price with the seller which will be transmitted to the rightholder, who may match the offer and purchase himself or decline and allow the bidder to consummate the purchase. Because the seller's reservation price is not at issue, the "negotiation" between the seller and the bidder boils down to the bidder making a single offer that maximizes her expected gain.

We can be sure that the bidder's offer, O_B, will be less than V_B, since a successful offer at the bidder's value (or higher) would yield no payoff for the bidder. Three outcomes are then possible. First, the bidder will succeed if O_B is greater than V_{RH}. Second, the bidder will lose and the property will be misallocated to the lesser-valuing rightholder if O_B is less than V_{RH} and V_{RH} is less than V_B. In other words, if the bidder is unlucky enough to have had the higher value but to have discounted her bid below the value of the rightholder, she will lose despite her higher valuation. Third, the bidder will lose the bidding, but there will be no misallocation, when V_{RH} is greater than V_B.

[48]This example supposes that while V_{RH} may in fact be higher or lower than V_B there is no bias between the two values. Given the previous discussion of insider idiosyncratic value, this may seem an odd assumption. The third party, however, may also bring value to the table. Perhaps the bidder is a turnaround expert or brings a needed infusion of cash. Although the bidder's value may not be idiosyncratic (it may be shared by other possible third-party bidders), it may be as large or larger than V_{RH}. In any event the conclusions reached do not depend on a lack of bias between V_{RH} and V_B.

Alternatively, suppose that there had been no right of first refusal and that the seller had conducted a progressive auction between the bidder and the rightholder.[49] In the auction scenario, assuming suitably small increments, the bidder succeeds if and only if V_B is greater than V_{RH}.

How did the introduction of the right of first refusal affect the fortunes of the three participants? To make matters concrete assume that V_B is 100 and that O_B is 96.[50] If V_{RH} is 90, then the bidder would have won an auction at 90 (or just over depending on the increments). Under the right of first refusal, the bidder would win at her bid of 96, so the bidder is worse off by 6 due to the right of first refusal. The rightholder is indifferent; he would have lost either way. The seller is better off by 6 in the right of first refusal scenario.

Now, assume that V_{RH} is 98. Under the right of first refusal, the rightholder matches the bidder's offer and wins at 96. In an auction the bidder, whose value is 100, would have won at 98. So compared with the auction result, the rightholder gains 2 (98 value minus 96 purchase price) by way of the right of first refusal, the seller loses 2 (sale at 96 versus sale at 98), and the bidder loses 2 (loss in right of first refusal versus success and profit of 2 in the auction). Unlike the first scenario, here there is a net loss to the three parties of 2 due to the misallocation of the property. That loss can be eliminated, of course, if the rightholder subsequently can resell the

[49]I will continue to use the label "rightholder" for consistency while recognizing that in this scenario the rightholder has no rights beyond those shared by the third-party bidder.

[50]This offer discount (offer of 96 vs. value of 100) approximates the optimum offer of the bidder given certain assumptions about the rightholder's range of possible values, as we will see below. At this point, however, the selection of these figures should be considered merely illustrative. Directionally, the results that follow hold for any discount selected by the bidder and any range of rightholder values.

property to the bidder. Notice, however, that even if no resale is possible, the parties to the right of first refusal contract, the seller and the rightholder, are indifferent in sum.

Finally, assume that V_{RH} is 102. Under the right of first refusal, the rightholder again matches O_B and wins at 96. In an auction the rightholder would have prevailed at 100. So compared with the auction result, the rightholder gains 4, the seller loses 4, and the bidder, who would have lost either way, is indifferent.[51]

The following table summarizes the results of this example:

Outcome Under Right of First Refusal Compared With Progressive Auction
(With V_B=100, O_B=96)

V_{RH}	Rightholder Gain/Loss	Seller Gain/Loss	RH + S Gain/Loss	Bidder Gain/Loss
90	0	+6	+6	-6
98	+2	-2	0	-2
102	+4	-4	0	0

The following conclusions may be drawn from this highly simplified analysis. Although there is often a shift in value from the seller to the rightholder and the property is sometimes allocated to the lesser valuing rightholder, the parties to the right of first refusal contract, in sum,

[51]The transaction costs of the various parties have been ignored in the foregoing analysis. At the time of bidding these costs are sunk and will not affect bidding behavior. Moreover, as I demonstrate elsewhere in the Article, the parties' transaction costs are not significantly affected by the bidding process utilized, and thus transaction costs have no significant impact on the relative outcomes. See *supra* Part II.B for analysis of the bidder's transaction costs and *infra* Part IV.B for discussion of the rightholder's and seller's costs.

are never worse off due to the existence of the right. As long as there is only one third-party buyer involved, an auction will not allow the seller and the rightholder to extract any of the bidder's value in excess of the rightholder's value. Thus, in this simplified, one-buyer universe the seller and the rightholder appear to suffer no net harm. The bidder, of course, is adversely impacted. The right of first refusal "negotiation" is loaded against her. The problem for the seller and the rightholder is that the adverse impact on the bidder dissuades third parties from participating, and, as we shall see, ultimately this creates a cost for the parties to the right of first refusal contract.

2. Detailed Analysis of the Bidder's Position. Let us look at the bidder's position, optimum strategies, and expected outcomes in the auction and right of first refusal scenarios more carefully. Suppose again that V_B is 100 and that the bidder doesn't know the rightholder's value but estimates that the rightholder's probable value is normally distributed with a mean of 100 and standard deviation of 5.[52] In an auction the bidder's strategy is simple; she raises her bid following each successively higher bid of the rightholder until she wins or reaches her indifference point. In this case, the bidder is learning something about the rightholder's value with each successive bid. If the probability distribution of the rightholder's value is indeed normal with a mean of 100, each participant has a 50% chance of winning the auction. The bidder's expected gain can be calculated by determining the bidder's probability of success (and, if successful, the gain) at each possible bid level in the auction up to the bidder's indifference

[52]Obviously a unique rightholder will place a unique value on a unique property. But a competing bidder attempting to estimate the outcome of an auction or to calculate the optimum bid and expected outcome in a right of first refusal situation can only estimate, probabilistically, her opponent's valuation of the property. The decision whether to incur transaction costs and proceed can only be based on such a probabilistic estimation.

point. As I demonstrate in the Appendix, the bidder's expected gain in this scenario is equal to 0.4 times the standard deviation of the rightholder's probability distribution, or, in this example, 2.0.[53]

Now assume all the same values for V_B and the mean and standard deviation of V_{RH}, but assume that the bidder is faced with a right of first refusal and must formulate a bid that will maximize her expected gain. In this situation the bidder loses the information generated by the auction. As I demonstrate in the Appendix, the bidder maximizes her expected gain by bidding at the rightholder's mean value less .75 standard deviations, in this case by bidding at 96.25.[54] At this optimum bid, there is a 23% chance that the rightholder's value will be less that 96.25, that the rightholder will not exercise his right, and that the bidder will consummate the transaction. The bidder's expected return, however, falls from 2.0 in the auction scenario to 0.85.[55] Of course the bidder can increase her chance of winning the property by bidding more than 96.25, but the increase in probability of victory is more than offset by the reduced margin

[53]Assume, as I do in the Appendix, that the auction is conducted in increments of 1 and that it begins with a bid of 81 from the bidder. The rightholder must bid 82 to stay in the contest. The slim chance that V_{RH} is less than 82 is multiplied by the bidder's gain of 19 to determine the bidder's expected gain at this bid. This process is repeated for bidder bids of 83, 85, etc., up to the bidder's final possible bid at 99. If the rightholder bids 100, of course, the bidder withdraws from the auction. The sum of the products of gain and probability at each step in the auction produces the overall expected gain to the bidder of 2.0.

[54]96.25 = 100 (the mean of V_{RH}) - .75 x 5 (the standard deviation of V_{RH}).

[55]More generally, the expected return utilizing the optimum bid in the right of first refusal scenario when V_{RH} is normally distributed about a mean equal to V_B is 0.17 times the standard deviation of V_{RH}.

between her bid and her value. Similarly, the larger prize achievable by bidding less than 96.25 is more than offset by the reduced probability of winning.[56]

Note that the bidder's ability to optimize her bid in the right of first refusal case is dependent on accurate estimation of both the mean and standard deviation of the distribution of the rightholder's value. Error in either direction on either measure will cause the bidder to choose a suboptimum bid, further reducing her expected gain. By comparison, estimation errors in the auction scenario have no effect on the actual bidding process. Thus, the calculated reduction in the bidder's expected return, from 2.0 to 0.85 in my example, is really the best a bidder could hope for in a right of first refusal situation. In reality, given the inability to perfectly optimize a right of first refusal bid, the reduction in expected gain will be larger.[57]

D. Conclusions and Implications for the Parties

1. Impact on the Bidder. Facing significant search and negotiation costs, a third party is discouraged from bidding against a right of first refusal by the reduction in the expected payoff caused by the instrument. The degree to which a third party is dissuaded should depend on the variability of the rightholder's value. This impact is not effectively ameliorated by the possibility of subsequent transfer.

[56]As this discussion indicates, and as the Appendix demonstrates, the optimum bid can be determined by trial and error using probability tables.

[57]The results of the auction and right of first refusal analyses are directionally the same, although the expected gains differ, if V_B is greater or less than the mean of V_{RH}.

a. Impact a function of the variability of the rightholder's value. Compared with the auction scenario, the right of first refusal format places the outside buyer at a serious informational disadvantage. A simpler and perhaps more intuitive way to see the impact is to recall that in an auction the bidder will succeed at V_{RH} each time V_B is greater that V_{RH}. In the right of first refusal situation, the bidder will succeed at V_{RH} or higher, since the bidder lacks the information produced by the auction, and the bidder will sometimes fail even when V_B is greater than V_{RH}. The reduction in expected gain for the third party created by the right of first refusal deters the outsider from investing in search and negotiating costs. Further, the larger the standard deviation of V_{RH}, the greater the impact of the right of first refusal. In my example, the right of first refusal costs the bidder at least 0.23 times the standard deviation of the rightholder's probabilistic value.[58] It follows then that a right of first refusal will have a larger deterrent effect on buyers when an insider's valuation is subject to wide variation. Variation in an insider's valuation is likely to be significant in cases involving close corporation shares or other unique property because of the inherent difficulty of valuing such property accurately and the potential for high insider idiosyncratic value.[59] Relatively high transaction costs faced by buyers, of course, become even more daunting as the expected return is depressed by the presence of the right of first refusal.[60]

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[58]An expected gain of 0.4 standard deviations in the auction case minus an expected gain of 0.17 standard deviations given an optimum bid in the right of first refusal case. *See supra* notes 53-55 and accompanying text.

[59]*See supra* Part II.B.

[60]A third party in close competition with a rightholder may be less dissuaded from bidding than this analysis suggests because that bidder would benefit from the rightholder paying more to the seller for the seller's property. In such a case the third party has an additional incentive to bargain aggressively despite the reduction in expected gain created by the right of

b. Impact not significantly ameliorated by the possibility of subsequent transfer. Part of the right of first refusal's cost to the bidder results from the misallocation of the property to the rightholder in situations in which the bidder has a higher value. This cost can be ameliorated if the rightholder can resell the property to the bidder. There are a number of obstacles to improving the parties' position through subsequent transfer, however. First, in losing the contest the bidder does not learn whether her value is above or below the value of the rightholder; she only knows that her *bid* was less than that value. So, further negotiation may be futile and may not be initiated by the unsuccessful bidder. If the bidder does choose to negotiate with the rightholder and learns through negotiation that her value is indeed greater than V_{RH}, and assuming some equality of negotiating skill, the bidder will succeed only at a price between V_{RH} and V_B, a price above that which would have succeeded at auction. Second, in some situations further negotiation between the successful rightholder and the still interested bidder cannot be undertaken without retriggering the right of first refusal process. For example, if one shareholder of a close corporation has exercised the right to preempt, the other shareholders would still have a right of first refusal on the proposed resale of those shares to the bidder. Third, in more unusual situations involving rights to lease or sell, the subject of the right of first refusal may not be transferable or the opportunity to reallocate may expire quickly.[61] For these reasons and

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first refusal. If the third party succeeds, he acquires the property; if he fails, then at least the costs of his competitor are increased. Professional sports teams negotiating with players whose contracts grant their current teams a right of first refusal provide an example of this effect. In addition to seeking the best players, each team should also benefit from driving other teams toward league salary caps. Of course, in the closed world of the professional sports league, a team adopting this strategy can expect reciprocation, and the participants may decide that collusion to keep salaries down is a better overall strategy.

[61]Suppose, for example, that *X* has a right of first refusal to *sell* a load of pipe to *A* for delivery by a certain date. *X* matches a price negotiated between *Y* and *A* for the sale of that pipe.

others, the possibility of subsequent transfer may reduce, but will not eliminate, the misallocation problem.

Moreover, misallocation of the property reflects just one component of the reduction in expected gain faced by a third party who bids for property encumbered by a right of first refusal. The bidder's expected gain is also reduced by successful bids that exceed V_{RH}. The subsequent transfer possibility does nothing to alleviate this cost to the bidder.

c. Anecdotal evidence as to the impact on outside bidders. Anecdotal evidence from practitioners confirms the inhibiting effect of rights of first refusal on third-party bidders. One lawyer with extensive experience with close corporations suggested that a right of first refusal essentially makes shares of a unique firm unmarketable.[62] A real estate attorney confirmed that buyers do not want to get involved in bidding on property encumbered by rights of first refusal.[63] Further evidence of the magnitude of the encumbrance is offered by agreements providing for the reimbursement of transaction costs incurred by unsuccessful bidders. In a set of agreements that granted one class of security holders a right of first refusal on the resale of another class of securities, the corporation was committed to reimburse legal and due diligence expenses of an unsuccessful outside bidder up to $500,000.[64]

X now has a binding agreement to deliver pipe to *A*. Although *Y* may be able to fabricate the pipe for less and share the gain with *X*, *X* may have no right to substitute another supplier in the contract. Moreover, even if *A* can be persuaded to amend the contract, the negotiating period, at the latest, expires on the delivery date.

[62]Telephone interview with Jeanne Rickert; Jones, Day, Reavis & Pogue (Jan. 1998).

[63]Telephone interview with George R. Barry; Squire, Sanders & Dempsey, L.L.P. (Jan. 1998).

[64]Option Agreement § 5.04 (April 10, 1992) (private agreement, on file with author).

2. Impact on the Seller and the Rightholder. The contracting parties lose nothing by adopting a right of first refusal that discourages a single outside bidder. Once we expand the model to allow for the possibility of several competing outside bidders, however, the cost to the seller and rightholder of dissuading such bidders becomes apparent.

a. A single outside bidder. Ideally, the parties to the right of first refusal contract, the owner and the rightholder, evaluate the impact of the encumbrance at the time of contract formation. Assuming that they can properly evaluate the costs that will arise when and if the owner decides to sell and that they can allocate these costs between themselves at the outset, the parties' principle concern is the combined net cost to them when and if a sale is made. If the parties could be guaranteed that there would be a single outside bidder at the time of sale, whether they create the right of first refusal or not, they would not be dissuaded from creating the right of first refusal. We saw above that, given a single bidder, the seller and the rightholder in combination are better off under the right of first refusal. They are happy that the outsider is bidding blindly against a right of first refusal since, in an auction between the rightholder and a single bidder, the seller cannot extract any value from the outside bidder beyond the value of the rightholder.[65]

b. Multiple outside bidders. If, however, there are several potential outside bidders with values above V_{RH}, a progressive auction would allow the seller to capture value above V_{RH}. Assume that V_{RH} is 96 and that a single outside bidder, Bidder 1, has a value of 100. As we have

[65]Theoretically, a portion of the bidder's surplus value could be captured if the seller transferred the property to the rightholder and allowed the rightholder to negotiate directly with the bidder. The difficulty would lie, however, in valuing the transfer from the seller to the rightholder and in dividing the surplus captured from the bidder. A central priority in selecting an instrument must be to determine objectively the price due to the seller on transfer.

seen, at auction Bidder 1 wins at 96 and the contracting parties jointly gain nothing above V_{RH}. Now assume that a second outside bidder, Bidder 2, has a value of 102 and that a third outsider, Bidder 3, has a value of 104. In a progressive auction between these four candidates, Bidder 3 will succeed at the next highest valuation 102. Of course, the seller can never extract the winner's surplus in an auction; that increment between the highest and next highest valuation is kept by the winner. It is clear, however, that if the presence of a right of first refusal discourages the entrance of bidders, as it should given the reduction in a bidder's expected return, then the parties to a right of first refusal contract reduce the potential realization from disposition of the property by adopting the instrument.[66]

If the encumbered property is a share of Microsoft, then, even if a few bidders are discouraged by a right of first refusal, a very slight reduction in offering price would provide plenty of outside interest, and the contracting parties would lose very little by the encumbrance. In such a case, however, the contracting parties had little to gain from encumbering the property with a right of first refusal. Nonetheless, this example highlights two general points. First, the cost to the contracting parties due to the reduction in outside interest should roughly correlate to the disadvantage faced by a third-party bidder. Second, the outsider's disadvantage is greatest with unique property subject to high search and negotiation costs and a wide variance in potential value to the rightholder.

The seller may offset the impact of the right of first refusal and encourage outside bidders to enter the fray by contracting with bidders to reimburse their transaction costs. This solution

[66]Recall that I am assuming that transfers between the contracting parties can be settled ex ante, so the parties have a mutual interest in extracting as much value as possible from third-party bidders. See *infra* notes 120-21 and accompanying text for more on this point.

may not improve the contracting parties overall position, however. As shown, the seller needs several bidders to extract value above V_{RH}, and the seller may be required to reimburse costs for several parties. Moreover, the seller has no way of knowing that the bidders who are induced to join the contest will have a valuation higher than that of the rightholder, so often the reimbursement will be wasted.[67]

Ex post, the right of first refusal obstacle will be costly for the seller when the property is worth more to several outsiders than it is to the rightholder, when a portion of the outsiders' surplus value could be captured by auction or otherwise, and when the impact of the right of first refusal is sufficient to deter most or all of these outsiders from bidding. I have discussed the factors that influence bidder reaction to the right of first refusal in a relative sense, but it is impossible to say anything concretely about the frequency or magnitude of this cost. Nonetheless, the fact that some parties are willing to provide sizable inducements to encourage the participation of third-party bidders indicates that the impact can be significant.[68]

III. FIRST PROPOSED JUSTIFICATION FOR RIGHTS OF FIRST REFUSAL -- INSURANCE AGAINST BARGAINING BREAKDOWN

This Part asks why contracting parties would adopt a right of first refusal and forego upside realization potential on the sale of property. The hypothesized answer is that the right of first refusal provides insurance against bargaining breakdown between the contracting parties. In

[67]I have assumed throughout that the owner's reservation price is low enough that it can be ignored safely. If the owner is considering an opportunistic sale, however, the presence of the right of first refusal may depress the realizable price of the property so much that it dissuades the owner from selling. The loss in utility if the owner is locked-in by the right of first refusal could be considered another cost of the instrument.

[68]*See supra* note 64 and accompanying text.

essence the argument runs as follows: The contracting parties do sacrifice some upside potential if outsiders who value the property highly at the time of sale are driven away, but ex ante the parties are more concerned about the possibility that the rightholder will have the highest value at sale time, and that something could go wrong in a negotiation between the seller and the rightholder that would jeopardize the high insider value.

Section A explains that the traditional justifications for rights of first refusal, particularly in the close corporation context, are really arguments about insurance against bargaining breakdown. Section B examines bargaining between insiders in the absence of rights of first refusal. Recognizing that an insider may place a high idiosyncratic value on the property, a rational seller, I argue, would not conduct an auction but would negotiate directly with the insider in an attempt to extract a portion of that idiosyncratic value. Given the negotiating framework selected by the seller, Section C analyzes the factors that could lead to a breakdown in bargaining and suggests that co-venturer and other relationships in which rights of first refusal are typically found are susceptible to bargaining failure. Section D looks at the cost of a breakdown if it occurs and finds that because of the likelihood of insider idiosyncratic value that cost is likely to be high.

A. Traditional Justifications are Really Bargaining Breakdown Justifications

The literature on close corporations provides several justifications for the restrictions placed on share transfer. Easterbrook and Fischel note that it is appropriate to restrict alienation in the close corporation context because the investors manage such ventures and the restrictions improve the odds of maintaining compatible management.[69] Moreover, they note that the

[69] *See* EASTERBROOK & FISCHEL, *supra* note 3, at 228-29.

restrictions may ensure that control remains within a family, which may limit opportunistic conduct.[70] O'Neal and Thompson echo these sentiments and explain that when shareholders manage they rationally want to retain the power to choose their future associates and to prevent the entry of outsiders of dubious integrity or business judgment.[71] O'Neal and Thompson provide a number of regulatory and tax advantages to controlling the number and identity of shareholders, as well.[72]

These rationales, however, only explain why the insiders of a close corporation may place a higher value on the shares being sold than would an outsider. Assuming that the insiders are equally free to purchase from the departing shareholder, these observations do not in themselves justify the transfer restrictions. If the insiders value the shares highly, normally we would expect that they would buy them.

Similarly, in the real estate context, I noted in Part II that a franchisee or lessee may value continuation in the premises highly due to the costs and potential loss of goodwill that would follow from relocation. Given the opportunity to buy the property outright and ensure such continuation, the tenant may be eager to purchase. However, this reasoning only explains why the tenant would be an aggressive bidder; it does not explain why a right of first refusal is necessary.

Clearly the unspoken assumption behind each of these justifications is that, in the absence of the restriction, something may go wrong in the negotiation between the seller and the highly

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[70] *See* i*d*. at 229.

[71] *See* O'NEAL & THOMPSON, *supra* note 3, § 7.02.

[72] *See* i*d*; *see also* Norton, *supra* note 4, at 804 (summarizing purposes of stock transfer restrictions).

valuing insider. Bargaining then may breakdown, and the property may be sold to a lesser-valuing third party. I do not mean to imply that the writers providing these justifications were unaware of this necessary additional step in the argument. On the contrary, it was obvious. I merely wish to make it explicit.[73]

Other cases and commentators suggest that by decreasing uncertainty the right of first refusal facilitates investment by rightholders.[74] A lessee, for example, faces a number of investment opportunities with regard to the leased property, many of which will not be transferable to a new location. In evaluating these options, the lessee faces one risk that the property owner will not renew the lease at the end of its term. A second risk is that the property will be sold and that a new owner will refuse to renew. The right of first refusal at least guarantees the lessee the opportunity to avoid the second risk, which may facilitate his earlier investments in the property. The risk avoided by the right of first refusal is the risk that the lessee will fail to consummate a purchase of the property even if he has a higher value, in other words, that bargaining will breakdown. Thus, traditional justifications, whether they focus upon reasons insiders value property highly or upon investment facilitation, are fundamentally about

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[73]Professor Kahan does make this point explicitly. *See* Kahan, *supra* note 3.

[74]*See, e.g.*, American Broadcasting Cos. v. Wolf, 430 N.Y.S.2d 275, 280-81 (N.Y. App. Div.), *appeal dismissed*, 413 N.E.2d 1173 (N.Y. 1980), *aff'd*, 420 N.E.2d 363 (N.Y. 1981) ("[T]he right of first refusal is used throughout the radio and television industry as a device in aid of the broadcaster-employer's retention of the services of major talent in whom the broadcaster has made a significant investment."); Christopher T. Wonnell, *The Contractual Disempowerment of Employees*, 46 STAN. L. REV. 87, 108 (noting that in *Wolf* the employee agreed to the first refusal provision to assure the employer that its investment would not be lost to a competitor). *See also* Kahan, *supra* note 3 (describing the investment facilitation phenomena and suggesting a hypothetical similar to that which follows).

the risk that the higher valuing insider will fail to consummate a purchase, despite his higher valuation. It is this risk that creates the incentive for the restriction.

B. Bargaining Between Insiders in the Absence of a Right of First Refusal

In Part II, I compared the bargaining dynamics and economics pertaining to the sale of property encumbered and unencumbered by a right of first refusal. In the case of unencumbered property I assumed that the seller would conduct a progressive auction. In an auction the insider -- the co-venturer, lessee, or other party that would have held the right of first refusal if it existed -- would be assured of acquiring the property if it valued the property more highly than any third party, and, thus, the insider would face no risk of losing his idiosyncratic value or of wasted investment. However, the seller in the auction scenario receives only the second-highest value and is unable to capture any of the idiosyncratic value placed on the property by the insider. If the seller believes that his co-venturer or lessee places a high idiosyncratic value on the property, the seller has a strong incentive to avoid an auction and negotiate directly with that insider in hopes of capturing some of the insider's premium value. This negotiating stance creates the potential for bargaining failure.

Suppose, for example, that one of two shareholders of a close corporation contemplates selling out and retiring. (I'll call the other shareholder the seller's "partner" ignoring the corporate formality.) The seller has spoken with her partner and knows that he wishes to buy her shares and bring his sons into the business. The seller also knows that her partner would be very unhappy to have an outsider thrust upon him at this stage of the business. The seller does not object to selling to her partner, but she has her sights set on a plush retirement and wants to maximize her realization. Both parties realize that the book value of the company stock is meaningless as the firm's value largely rests in the potential of several promising new products.

The partner decides that his reservation price is 150.[75] There are no rights of first refusal on the sale of these shares.

The seller enlists an investment banker who indicates that an outside buyer probably could be induced to pay up to 100. The banker indicates that the true value is certainly higher, but that any outsider is going to discount the asset values and expected cash flows of the corporation because of the 50/50 control split with the partner and the uncertainty that the division of control entails. The value of 100 achievable in a sale to an outsider sets the seller's reservation price.

Because an auction between the partner and an outside bidder is unlikely to generate more than 100 for the seller, the seller's best strategy, it would seem, would be to skip the auction and negotiate directly with her partner based upon the threat of selling to an outsider. In such a negotiation neither party knows the other's reservation price. Although it is true that the partner can enlist his own banker to value the business, the partner would realize that there is a great deal of uncertainty in the valuation process. The seller, on the other hand, may suspect that her partner places a large premium on the shares, but she can't determine how high a price he will pay. Assuming roughly equal negotiating skill, one would expect the parties to agree to a figure somewhere in the middle; perhaps they would settle at 125.

If the negotiation between the partners unfolds as described, the introduction of a right of first refusal only serves to transfer wealth from the selling to the remaining shareholder. Suppose that with the encumbrance of a right of first refusal the seller only can find one interested bidder,

[75]Throughout this discussion the term "reservation price" simply refers to a party's indifference point -- the maximum price that would be acceptable to a buyer or the minimum price acceptable to a seller in a negotiation.

who offers 90. In such a case the right of first refusal transfers 35 from the seller to her partner. The transfer alone obviously fails to justify the right of first refusal since at the time of contract formation neither party knew which partner would sell first and which would remain. More importantly, as shown above, by incorporating the right of first refusal the parties risk dissuading bidders who may place a value on the property above that of the remaining shareholder. A successful negotiation between the parties is just one possible outcome, however, bargaining breakdown is another.

C. Factors Contributing to Bargaining Breakdown in the Absence of a Right of First Refusal

Generally we expect multiple-round bargaining to succeed when a zone of agreement exists, that is, when the buyer's reservation price is greater than the seller's, as will often be the case in the arrangements that generate rights of first refusal. A number of factors, however, can contribute to a breakdown in bargaining despite the existence of a zone of agreement, and the relationships in which rights of first refusal are found appear to be quite susceptible to bargaining failure.[76]

1. Strategic Bargaining and Power Inequality. Strategies adopted by a bargainer to maximize his share of the joint value achievable through the negotiation put the successful consummation of the negotiation at risk. Such strategies, however, are universally employed and

[76]The discussion that follows focuses on issues that appear to be particularly relevant to bargaining between insiders in the absence of rights of first refusal. Obviously many other factors affect bargaining success or failure. *See generally* BARRIERS TO CONFLICT RESOLUTION (Kenneth J. Arrow et al. eds., 1995); JEFFREY Z. RUBIN & BERT R. BROWN, THE SOCIAL PSYCHOLOGY OF BARGAINING AND NEGOTIATION (1975).

Although the examples that follow concentrate on bargaining between co-venturers, the observations are equally applicable to other right of first refusal situations.

range from simple deception as to a party's true level of interest to credible threats to terminate negotiations and walk away.[77] It has been suggested, however, that more successful bargaining tends to result when the bargaining power of the parties to the process is evenly balanced, as, for example, when both parties possess an ability to lodge credible threats.[78]

Because the joint value of the bargain is effectively set by the difference between an insider's and an outsider's value, the insiders bargaining in the absence of rights of first refusal are primarily negotiating over the division of the pie.[79] Thus, the focus of the parties tends to be concentrated not on joint value maximization, but on strategies for appropriating the maximum share, a focus that may threaten the success of the negotiation. Moreover, bargaining power often is unequally distributed among insiders bargaining in the absence of a right of first refusal. A partner who is cashing out, as in the example above, may be in a hurry to receive her cash while the remaining partners may approach the negotiations in a more leisurely fashion. Such one-sided time pressure reduces the seller's bargaining power. Moreover, unlike the inside buyer, the seller may have no credible threat of breaking off negotiations if pushed down towards her reservation price. As a one-time player, the seller gains nothing from terminating the

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[77] *See* Robert H. Mnookin & Lee Ross, *Introduction*, in BARRIERS TO CONFLICT RESOLUTION, *supra* note 76, at 3, 7-10.

[78] *See* RUBIN & BROWN, *supra* note 76, at 199.

[79] In many negotiations the size of the pie, as well as its division, is at issue. A labor negotiation, for example, may produce an agreement that increases productivity and enterprise profits that may be shared in the future. In such a case the parties should focus, at least in part, on pie maximization. By contrast, rights of first refusal almost always arise in situations in which a relationship is being terminated. For example, a close corporation shareholder may be departing or a lessee may be buying out his lessor. In these situations there will be no ongoing relationship through which to share subsequent gains and, thus, no incentive to jointly maximize the pie.

negotiation and selling to a lesser valuing outsider. On the other hand, the seller may have equal or greater power if the seller is a repeat player who has a credible incentive to break off negotiations to create or maintain a reputation as an effective bargainer[80] or if the remaining partners are very concerned about a sale to an outsider. In any event, disparities of power and the use of strategic bargaining would seem to be common in negotiations between insiders in the absence of a right of first refusal.

2. Equity Barriers. Because a small gain is better than no gain, I suggested above that a powerless, one-time seller being driven down towards her reservation price is not likely to break off negotiations or to pose a credible threat to do so. Although this would appear to be the position of a perfectly rational seller, in the real world bargainers may refuse to accept outcomes that deviate too far from what they perceive to be a fair result and may, in fact, accept an economic loss to avoid providing an undeserved windfall to the other party to the negotiation. This equity barrier to consummation has been demonstrated experimentally through games in which two parties with an equal basis for claiming a gain undergo take-it-or-leave-it bargaining. In this "ultimatum game" one party proposes a division of the gain which the other party may accept or reject. If the division is accepted, each party keeps his share; if rejected, the parties

[80]A close corporation shareholder who is selling off only a portion of her interest may have an incentive to break off negotiations and sell to an outsider at a price below that offered by an overly aggressive insider. The loss incurred by the seller in the first round may be recouped when she goes to sell a second traunch of shares if her partners then negotiate more circumspectly. It is unlikely, however, that a close corporation shareholder would be in such a position. Agreements often limit shareholders to making a complete divestiture on retirement or death. Even if piecemeal sale is permitted, a partially divested shareholder may find herself in a difficult minority position. By contrast, commercial real estate participants are more likely to be repeat players by virtue of their involvement in numerous deals. Within a given venture, however, their interests may not be divisible.

receive nothing. Ultimatum offers of significantly less than fifty percent are frequently rejected.[81]

Equity barriers may be important in the negotiations with which I am concerned for two reasons. First, given the frequent inequality in bargaining power, the high-power party may be tempted to insist on a severely disproportionate division of the joint value which the low-power party may reject on fairness grounds.[82] Second, it will be more difficult to decide what is fair and, thus, to arrive at a fair division in many of these longstanding relationships. To whom should the value associated with maintaining family control be assigned? How much should the departing partner get for his years of hard work? What was the original understanding when the business was formed many years ago?[83]

3. Poor Relationships and Illicit Utility in Disagreement. In discussing equity barriers, I assumed that a zone of agreement existed but that agreement failed due to one party's overreaching, which led to rejection by the other. Serious biases, however, could eliminate the zone of agreement. One partner may be leaving a venture specifically because of a soured

[81]See Mnookin & Ross, *supra* note 77, at 10-13, for a general discussion of equity barriers to conflict resolution. A classic experimental study of the ultimatum game is reported in Werner Guth, Rolf Schmittberger, & Bernd Schwarze, *An Experimental Analysis of Ultimatum Bargaining*, 3 J. ECON. BEHAV. & ORGANIZATION 367 (1982). More ultimatum game studies and analyses are presented in Christine Jolls et al., *A Behavioral Approach to Law and Economics*, 50 STAN. L. REV. 1471 (1998).

[82]More typically, the high-power party will anticipate the fairness behavior of the low-power party and will temper his demands accordingly. *See* Jolls et al., *supra* note 81. Thus, equity barriers alone do not routinely lead to bargaining breakdown. Because some high-power parties will fail to account for the fairness response, however, this phenomenon does contribute to a certain amount of bargaining failure.

[83]One might expect that experienced bargainers would be less susceptible to this bias and more likely to act in accordance with rational expectations. This suspicion is not backed up by the experimental evidence, however. *See* Jolls et al., *supra* note 81.

relationship. Bargaining over the value of the departing partner's interest against a backdrop of acrimony increases the difficulty of a task that is not easy under the best of conditions. Moreover, an extremely disgruntled partner may receive utility from the prospect of forcing an outsider upon the remaining partners. If the remaining partner values the property at 110, a disgruntled seller who receives value of 10 from disrupting the venture will be willing to sell to an outsider at 100. The failure of the seller and the partner to reach agreement in this latter case is not, strictly speaking, an example of bargaining breakdown. There was no bargain to be reached. Nonetheless, the parties may prefer to guard against the introduction of such illicit utility into the bargaining situation. Although any relationship may be susceptible to such souring, close corporation or other co-venturer relationships, which often involve family as well as business ties, probably are more likely to suffer from this defect than are leasing and franchising relationships.[84]

4. The Seller's Utility in Selling Outside of the Venture. Even absent hostility between the parties, situations may arise in which an owner receives utility from selling outside of the venture. In some ventures, such as jointly owned oil pipelines, partners are also competitors. All else being equal, a departing partner may prefer that its interest be transferred to a third party in order to avoid enlarging the market share of any of the remaining partners/competitors. As in the case of the particularly disgruntled shareholder, a failure to reach agreement between the departing and remaining partners may then follow from the lack of a potential bargain, rather

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[84]One suspects that inexperienced bargainers may be less able to put aside hard feelings and complete a negotiation in a poisoned environment. If so, shareholders of close corporations, who often have little experience in negotiating matters as significant as the departure of a partner and the future of the business, may face an added obstacle to consummation.

than from bargaining breakdown. Again, however, the partners may prefer to protect against such an eventuality.

5. Asymmetric Information. Information disparities are a serious problem in single-round bargaining. Essentially it is an information disparity that places the outside bidder in such an awkward position in the single-round right of first refusal scenario. In multiple-round negotiations information asymmetries are less of a barrier to completion as information is gained through the bargaining process. Nonetheless, if the seller in my earlier example cannot convince her partner that her reservation price is not below 100, the partner may push too far and the shares may be sold elsewhere.

Although one would normally expect co-venturers and others involved in ongoing relationships to possess roughly equivalent information concerning the business,[85] the parties in the negotiations with which I am concerned face a critical information gap. I have argued that in the absence of a right of first refusal a departing partner often will choose a negotiation over an auction in order to capture a portion of the remaining partner's idiosyncratic value. The departing partner can only guess at the *extent* of this idiosyncratic value, however. Only the remaining partner knows what retention of family control, for example, is really worth to him.

In combination the foregoing factors suggest that the failure of parties to reach agreement, where on the surface an agreement appears achievable, will not be uncommon. As noted, utility derived from selling to an outsider reflects a situation in which the surface appearance of a zone of agreement is illusory. Because the parties may choose to protect against these "unusual" utility barriers, as well as against the traditional barriers of strategic bargaining,

[85]At the least we would expect parity of information to be greater between co-venturers than between strangers.

equity concerns, poor relationships, and information asymmetry, we may consider them all as factors contributing to bargaining breakdown.

D. The Cost of Bargaining Breakdown and the Decision to Buy Insurance

In determining whether to invest in a right of first refusal as insurance against bargaining breakdown, the contracting parties must consider the cost of that eventuality as well as its likelihood. If a zone of agreement does exist between the departing and the remaining partners, the immediate cost of a breakdown in bargaining is simply the difference between the value placed on the property by the remaining partner and the sale price to the outsider.[86]

The likelihood that an insider will place idiosyncratic value on the property at the time of sale is central to the question of whether the parties will wish to purchase insurance against bargaining breakdown.[87] Compare the shareholder of the publicly traded company with the close corporation shareholder I have focused upon above. Because management and ownership are not tied in the public company and the voting power associated with any small traunch of shares is negligible, the public company shareholder is indifferent to the identity of her investment partners in the venture. Thus, unless the accumulation of a control block is at issue, public company shareholders place no idiosyncratic value on the shares owned by others. Such shareholders have no interest in maintaining the status quo or in blocking certain buyers, would

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[86]If in my previous example the departing partner, after a breakdown in bargaining, sold her shares for 100 to an outsider while the remaining partner valued the shares at 150, the cost of bargaining breakdown is 50. I view this as a joint cost to the contracting parties, the two partners, who in this case did not create any insurance against bargaining breakdown.

[87]The potential for significant insider idiosyncratic value may correlate with the uniqueness of the property. *See supra* notes 42-43 and accompanying text.

suffer no cost due to bargaining breakdown, and obviously would be unwilling to purchase insurance against that eventuality.

Risk aversion also may factor into the willingness of the participants to purchase insurance against bargaining breakdown. The likelihood of bargaining breakdown between the departing and remaining participants of a close corporation may be quite small, but the costs of breakdown may be very high. [88] Often, both the shareholder's wealth and employment are tied up in the close corporation.[89] This high exposure suggests that a right of first refusal may be incorporated as insurance even if the expected cost exceeds the expected benefits. A lessee or franchisee whose livelihood is tied to the business also may be significantly risk averse. By contrast, a commercial investor involved in a number of projects is likely to be less risk averse and is less likely to purchase expensive right of first refusal insurance for any given venture.

Finally, as discussed in Part III.A, the existence of a right of first refusal facilitates investment in the venture and adds value even if the right is never exercised.[90] One cost of failing to insure against bargaining breakdown, then, may be a reduction in profitable investment in the enterprise. The influence of this factor will vary case by case. For example, a lessee generally has no assurance of renewal at the end of the lease term. The insertion of a right of first refusal, which protects only against the substitution of an unfavorable lessor, should have a modest impact on the lessee's appetite for investment. The shareholders of the close corporation,

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[88] *See supra* notes 69-72 and accompanying text.

[89] *See* EASTERBROOK & FISCHEL, *supra* note 3, at 229 ("investors in closely held corporations have large percentages of their wealth tied up in one firm"); O'NEAL & THOMPSON, *supra* note 3, §1.08 ("employment by the [close] corporation is often the shareholder's principal or sole source of income").

[90] *See supra* note 74 and accompanying text.

on the other hand, may be significantly influenced in their investment decisions by the security that is provided by a right of first refusal.

IV. ALTERNATIVE MEANS OF INSURING AGAINST BARGAINING BREAKDOWN

I have hypothesized that rights of first refusal are desirable to the contracting parties because they provide insurance against bargaining breakdown. The previous Part demonstrated that such insurance is valuable in the circumstances in which rights of first refusal are used, because the threat of bargaining breakdown absent such protection is quite real and significant insider idiosyncratic value may be at risk. As we have seen, however, a right of first refusal imposes a cost on the contracting parties by discouraging third parties from bidding. It is not possible to say generally whether the insurance benefit exceeds the cost, but the discovery of a more efficient alternative to the right of first refusal -- an instrument that provides equivalent insurance at a lower cost -- would undermine the insurance justification for the right of first refusal. This Part examines alternative means of insuring against bargaining breakdown and concludes that the right of first refusal can be improved upon.

Section A investigates several traditional alternatives to the right of first refusal -- contractual provisions that are employed or have been employed in similar circumstances -- but the analysis suggests that none of these devices provides an adequate substitute for the right of first refusal. Section B, however, argues that equivalent insurance against bargaining breakdown could be provided at a lower cost through the adoption of a new device, a commitment to auction.

A. Traditional Alternatives to the Right of First Refusal

1. The Appraisal, Market Index, and Fixed Price Alternatives. The ideal instrument for the contracting parties would guarantee the rightholder an opportunity to purchase the asset at the best price available to the seller from an uninhibited group of third-party buyers. The right of first refusal, as we have seen, inhibits buyers. It drives some away and causes the still willing bidder to strategically bid below his value. If a market price for the property could be determined objectively, uninfluenced by the existence of the right of first refusal, and used as the rightholder's triggering price, the contracting parties would be better off.[91] The difficulty is that only the most fungible or commoditized property is susceptible to accurate, objective pricing by way of appraisal or market index, and, as we have seen, property that is fungible or commoditized is less likely to carry idiosyncratic value and warrant protection against bargaining breakdown.[92] Bushels of wheat and shares of Microsoft are readily appraisable, but there is no incentive to subject these assets to a right of first refusal. In addition to being subject to rights of first refusal, close corporation shareholders often have the right to sell their shares back to the

[91]The contracting parties would be better off because of the reduced possibility that a sales opportunity to a third party at a price above the rightholder's value has been missed.

[92]This is the one point in the analysis in which the correlation, or lack thereof, between uniqueness and insider idiosyncratic value does make a difference. If fungible property carries significant idiosyncratic value, the appraisal strategy could be superior to the right of first refusal. Many commercial real estate properties, particularly facilities which are leased or franchised in large numbers, such as gas stations, should be appraisable with reasonable accuracy. Moreover, strong goodwill could create idiosyncratic value for the lessee or franchisee. But as suggested *supra* note 43, one would not expect a franchisee to rely on a right of first refusal to protect that idiosyncratic value.

corporation at an appraised price. Given the lack of a liquid market for these shares, however, such appraisals are not expected to be highly accurate.[93]

Perhaps the accurate appraisal problem associated with relatively unique property has contributed to some of the rare fixed price rights of first refusal that have been granted. As we noted in Part I, however, fixed price triggers are unlikely to mirror reality, particularly over extended time periods.

Some assets may be susceptible to objective pricing in the future by way of a market index. Parties dealing with renewals or renegotiations that are certain to occur may find it worthwhile to invest in the formulation of an index in order to preempt future bargaining difficulties with respect to these assets. The right of first refusal serves to protect against a contingency that may never occur, however. Thus, the parties incentive to invest in a complex mechanism to replace such a right is much reduced.

2. Good Faith Commitment to Negotiate. As noted above, an exclusive commitment to negotiate for a fixed period places pressure on a time-sensitive party to reach agreement. Unless that pressure is significant, however, the commitment to negotiate does not eliminate the risk of bargaining breakdown. A commitment to bargain in good faith does not prevent an owner from attempting to extract a portion of the rightholder's idiosyncratic value. The parties could agree, ex ante, to negotiate towards a market price (as opposed to the best achievable price) if the

[93]Agreements mandating that a close corporation buy out a shareholder, at least on retirement or death, are common. Given the cost and inaccuracy of market-based appraisal, however, less complex valuation methods, such as those employing modified book value, often are utilized. *See* O'NEAL & THOMPSON, *supra* note 3, § 7.26.

triggering event occurred, but such an agreement would be difficult to enforce unless the property were extremely fungible.[94]

3. Right of First Offer. Upon notice from the seller, the holder of a right of first offer is provided the opportunity to offer a price for the property which, if not acceptable to the seller, becomes the seller's floor in negotiating with other bidders.[95] In this situation the roles of the rightholder and the third-party buyer are reversed. Now the rightholder must calculate a single bid that maximizes his expected return in an information vacuum. As opposed to multiple-round negotiations between the seller and the rightholder, this approach apparently increases the risk of bargaining breakdown.

A variation on the right of first offer requires the *seller* to propose a price to the rightholder, which, if not accepted, becomes the seller's floor for negotiation with outside bidders.[96] Although the seller must propose the price, the rightholder again is in a disadvantaged

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[94]A commitment to negotiate may be entirely appropriate, of course, in many situations in which a right of first refusal is inappropriate. Consider, for example, how a true right of first refusal would play out in the employment context. An employee nearing the end of his contract would negotiate the best deal that he could with another employer. Then the current employer would have the right to preempt that deal and rehire the employee under the negotiated terms. Such an outcome would be fine if the employee were indifferent between working for one employer or another. If the initial employment relationship has soured, however, the employee faces the risk of becoming locked-in to an unsatisfactory arrangement. Even worse, the existence of the right of first refusal partially insulates the employer from the consequences of mistreating the employee. Most employees, one imagines, would be highly adverse to accepting such risk. Thus, true rights of first refusal in the employment context should be rarely observed. *See, e.g.*, American Broadcasting Cos. v. Wolf, 430 N.Y.S.2d 275 (N.Y. App. Div.), *appeal dismissed*, 413 N.E.2d 1173 (N.Y. 1980), *aff'd*, 420 N.E.2d 363 (N.Y. 1981) (right of first refusal effectively served as a three-month non-compete clause and, although violated, was not specifically enforced).

[95]*See supra* note 15 and accompanying text.

[96]Condominium conversion statutes that grant first offer rights to apartment tenants frequently take this form. *See infra* Part VII.B.1.

position. The seller is not obligated to dispose of the property and may propose a relatively high price. The rightholder may have idiosyncratic value above this price but may pass, doubting that a third party will value the property so highly. Essentially, the rightholder is betting on receiving another opportunity to purchase at a lower price. In passing, however, the rightholder creates the possibility that a lesser valuing third party will purchase the property, exactly the eventuality that the right of first refusal was designed to avoid. Thus the right of first offer, however configured, is a poor substitute for the right of first refusal.

B. A Commitment to Auction as a Superior Insurer Against Bargaining Breakdown

The threat of bargaining breakdown only arises when an opportunistic seller elects to negotiate one-on-one with an insider in an attempt to extract a share of the insider's idiosyncratic value. As with a right of first refusal, a commitment by the owner to dispose of the property by way of an auction in which the rightholder has an opportunity to participate provides complete insurance against bargaining breakdown. Unlike a right of first refusal, however, potentially high-valuing third-party bidders are not disadvantaged and driven away by an auction and, thus, the ex ante cost to the contracting parties of including such terms is reduced.

1. The Design and Implementation of a Commitment to Auction. Suppose that, in lieu of granting a right of first refusal, a lessor or co-venturer commits to publicly auction the property should he desire to sell. How would such a procedure work? First, let us dispense with the mental picture of a stockyard auctioneer. Although the model of the progressive, open-outcry auction is analytically useful, there are obvious drawbacks to requiring bidders for the shares of a

close corporation, for instance, to meet and participate in such an auction.[97] Luckily, however, the progressive-auction result can be duplicated by a sealed-bid procedure. It has been shown that awarding a property via sealed bid to the highest bidder, but at the second-highest price, induces each bidder to submit his full valuation and mirrors the result of the progressive, open-outcry auction.[98]

Thus, in implementation a commitment to auction would work very much like a right of first refusal. The rightholder would be notified of the owner's intention to sell and would be given requisite notice of the date on which sealed bids are due.[99] The owner would be permitted to set a reservation price, and the entire process could be managed by an escrow agent to ensure fairness. On the due date, the bids would be opened, and the property awarded to the highest bidder, or retained by the owner if no bid exceeded his reservation price.

2. An Economic Comparison of the Commitment to Auction and the Right of First Refusal. How are the parties affected by the switch from right of first refusal to commitment to auction? Essentially, this question was answered in Parts II and III. First, the protection offered

[97]In addition to travel and coordination problems, participants in open-outcry auctions may be susceptible to psychological manipulation by other participants or the auctioneer. *See, e.g.*, Doris Athineos, *How to Avoid Getting Hammered*, FORBES, Apr. 21, 1997, at 400-03.

[98]*See* William Vickery, *Counterspeculation, Auctions, and Competitive Sealed Tenders*, 16 J. FIN. 8, 20 (1961). In theory, the expected revenues from first-price-sealed-bid and from second-price-sealed-bid auctions are the same. A seller's choice between the two formats would depend on the risk of collusion and bidder risk aversion. *See* BRIAN HILLIER, THE ECONOMICS OF ASYMMETRIC INFORMATION 153-65 (1997).

[99]This procedure could be carried out in one step, as suggested above, or in two steps. In a two-step procedure the owner would notify the rightholder of the owner's intention to offer the property for sale and the rightholder would be required to trigger the sealed-bid-auction process. This two-step process would efficiently bypass the auction in cases in which, due to lack of funds or financing, for instance, the rightholder had no real interest in acquisition of the property.

against bargaining breakdown appears identical. I noted earlier that bargaining breakdown arises when the owner, expecting his partner or lessee to have a high idiosyncratic value, bypasses the auction and negotiates directly with the insider in order to extract a portion of that idiosyncratic value. If the owner commits to auction and the insider is given notice and an opportunity to participate, however, the possibility of bargaining breakdown is eliminated. As long as the insider places the highest value on the property, he will prevail at auction. So, in terms of insurance value, the right of first refusal and commitment to auction are equivalent.

Second, the ex ante cost to the parties of insuring against bargaining breakdown has been reduced by adoption of the commitment to auction. In Part II it was shown that a third-party bidder participating in an auction had a significantly higher expected gain than did a bidder bargaining in the face of a right of first refusal. By leveling the playing field for outsiders, the commitment to auction makes it easier for the seller to attract bidders and raises the probability of extracting value beyond that assigned to the property by the rightholder.

Of course the rightholder was getting a beneficial deal under the right of first refusal and, relative to that case, value is transferred from the rightholder to the seller under the commitment to auction. Thus far, however, I have ignored ex ante transfers between the contracting parties, confident that these can be worked out in contract formation. Subsequently, I will show that this factor actually favors the creation of commitments to auction.

3. The Practical Differences Between the Commitment to Auction and Right of First Refusal. Although the commitment to auction appears preferable theoretically, there are several practical differences between the instruments that may bear on the parties' selection. First, the seller conducting an auction must specify every element of the contract except for price. Under some right of first refusal agreements, the seller may have latitude to negotiate terms other than

price with interested bidders. This opportunity could result in an improvement in the contract for the seller and the third party. However, as noted in Part I, the parties to the right of first refusal agreement normally will limit the seller's ability to craft unique terms because such flexibility could be used to circumvent the right of first refusal. Moreover, nothing would bar a seller from optimizing auction terms through preliminary negotiations with interested third parties. Thus, this difference does not appear significant.

Second, the rightholder faced with an auction must conduct a detailed evaluation and precisely value the property prior to the submission of bids. Under a right of first refusal, a rightholder may have had a bid submitted to him that was clearly low or clearly high relative to his value and with respect to which little detailed analysis would be needed to accept or reject. If the particular arrangement is likely to generate frequent exercise opportunities, this drawback to the auction could be significant. For example, a close corporation arrangement could involve a sizable number of shareholders each of whom has the right to sell small traunches of shares. More typically, however, the opportunities for exercise will be infrequent, and the difference between the auction and right of first refusal scenarios will simply be in the timing rather than in the level of analysis undertaken by the rightholder. There is at least a partial offset to this effect as well. Under the commitment to auction, the third-party bidders need only assess their own valuation. The additional step of assessing the first-refusal rightholder's likely valuation and determining an optimum bid given that estimate is eliminated, and this effort does represent a small part of the transaction costs faced by outside bidders which directionally contributes to bidder flight and reduced value.

Overall, the additional analytical burden on the rightholder and increased specification requirements on the seller do not seem sufficient to outweigh the advantages the auction provides in retaining third-party bidders and preserving upside potential on the sale of the property.

4. The Superiority of the Commitment to Auction as an Insurance Provider Undercuts this Justification for the Existence of Rights of First Refusal. The commitment to auction is simply an analytical invention. I am unaware of the use of such a device or anything similar in the contracting world. Nevertheless, given the simplicity of the device and the practical similarity to the dominant right of first refusal vehicle, it would be surprising that contracts had not migrated in this direction if bargaining breakdown insurance was, indeed, the primary rationale for rights of first refusal.[100]

V. SECOND PROPOSED JUSTIFICATION FOR RIGHTS OF FIRST REFUSAL -- INHIBITING EXIT

As noted in Part III.A, the close corporation literature provides a number of reasons that participants would wish to restrict the free transferability of shares. Typical are suggestions that the participants may wish to have the power to choose their future associates, to block the entry of a bad actor, to maintain family control, or to control the number or identity of the shareholders to ensure tax and regulatory compliance.[101] Moreover, it has been suggested that investment by

[100]None of the practitioners that I spoke with on the subject had ever encountered a contractual commitment to auction or anything similar. Their first impressions were that current users of rights of first refusal would not be interested in a commitment to auction as an alternative. I believe this attitude partially reflects the fact that often the primary purpose of a right of first refusal is to inhibit exit by co-venturers, as is discussed in the next Part, and partially reflects a discomfort with auctions in their conventional form.

[101]*See supra* notes 69-72 and accompanying text.

the rightholder may be facilitated by restricting the transfer of the property to a third party with different plans.[102] The implication behind each of these justifications is that the participants are less concerned about a party leaving a venture than they are about the composition of the venture after a party has exited. This story implies that rights of first refusal are primarily about controlling who is to become a participant in a venture.[103]

But this cannot be a complete and accurate picture. As we have seen, a commitment to auction would serve the same purpose at a lower cost to the contracting parties. In this Part, I suggest that the central motivation behind most right of first refusal clauses, particularly in close corporation or co-venturer cases, is to inhibit exit. The participants genuinely may be concerned about the identity of new entrants, but the primary motivation must be to discourage participants from leaving. Focusing on co-venturing situations generally and on the close corporation in particular, this Part examines why contracting parties would wish to inhibit exit and why they would select the right of first refusal to accomplish this end. The following Part will question whether this explanation is persuasive in all contexts in which we observe rights of first refusal.

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[102]*See supra* note 74 and accompanying text.

[103]*See, e.g.*, O'NEAL & THOMPSON, *supra* note 3, § 7.26 (a "share transfer restriction is usually intended to keep strangers out of a close corporation").

A. Why Co-Venturers Would Wish to Inhibit Exit

In the close corporation scenario or, in fact, in any reciprocal arrangement, the participants may value stability within the membership highly. Although an auction guarantees the insiders the opportunity to purchase the interest of a departing member, the participants may prefer that no member departs. There are several possible reasons: At the time of sale the insiders may lack the cash to buy the departing member's interest, or, simply for diversification reasons, the insiders may prefer not to increase their investment in the venture.[104] The members may be less concerned about the disruption caused by the entry of a new partner than they are about the loss of the management skills of a departing partner.[105] Moreover, a high level of stability within the investment and management group may further facilitate investment by the participants.[106]

B. Why Co-Venturers Would Utilize a Right of First Refusal to Inhibit Exit

At first glance the right of first refusal seems a clumsy mechanism for inhibiting exit. The right does not restrict alienability absolutely; it just adds a hurdle, the height of which will vary from case to case. If co-venturers really wanted to control alienation of interests, why did

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[104]*See supra* note 99 and accompanying text.

[105]O'Neal and Thompson suggest that the departure of a shareholder who performs an essential function may be disruptive, but their focus remains on the quality and compatibility of the replacement. *See* O'NEAL & THOMPSON, *supra* note 3, § 7.02.

[106]In Part III.A, I discussed the argument that rights of first refusal decrease risk and facilitate investment by the rightholder. The focus of that argument was on the risk that a new owner might have different plans for the property and refuse to renew a lease or to proceed with the plans of a close corporation. The risk I have in mind here is slightly different. Here, investment is facilitated by minimizing the risk that a highly valued partner may leave or that the remaining venturers will have to infuse additional cash into the venture to stave off disruptions.

they not simply contract for this result?[107] I believe there are two answers to this question. First, as practitioners confirm, the right of first refusal does an effective job of restraining transferability of interests, particularly in the close corporation situation. Second, the right of first refusal has become a legally acceptable means of discouraging sales, and courts traditionally hostile to restraints on alienability have tended to invalidate more obvious restrictions.

1. Fitness of the Right of First Refusal for Inhibiting Exit. Like a direct bar on alienability, a right of first refusal imposes no direct costs on any participant in the venture until a member seeks to sell his interest. Unexercised rights cause no reduction in cash flow or income. Moreover, if the group makes a collective decision to sell or to allow one or more participants to sell their interests unencumbered, the group can agree to remove the share transfer restriction. Thus, the instrument serves as a form of financial handcuffs, depressing the realization of any partner who decides to exit unilaterally.

The effectiveness of the handcuffs in any particular case depends on the impact of the instrument on third-party bidders. As demonstrated in Part II, this impact will be a function of the number of likely bidders, the relative uniqueness of the property, and the potential for high insider idiosyncratic value. At the time of contracting, of course, the participants will not be able to predict how effective a restraint the right of first refusal will be, but practitioners indicate that in the close corporation setting, at least, the right of first refusal generally stymies sales to outsiders.[108]

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[107]If allowed full freedom of contract, shareholders of a close corporation could contract for a majority, supermajority, or unanimous vote requirement to permit the sale of any shares.

[108]*See supra* note 62 and accompanying text. It may be that close corporation participants who do not know ex ante whether they will be a buyer or a seller of the interests of their firm in

2. Judicial Hostility to Restraints on Alienability. Historically, courts have been suspicious or even openly hostile to restraints on the free alienability of shares.[109] Invoking common law norms favoring the free transferability of personal property, some late-nineteenth-century courts held rights of first refusal to be unreasonable restraints.[110] Judicial attitudes have evolved in the past century, however, and most states have now adopted statutes expressly authorizing rights of first refusal and similar share transfer restrictions. These statutes do not grant corporations or their shareholders complete freedom to restrict transfers, however, and they often subject certain types of restrictions to a reasonableness test.[111] Today, share transfer restrictions are seldom invalidated outright, as close corporation agreements have come into line with the statutory safe harbors or liberalized judicial precedent validating certain restrictive practices. Nonetheless, a continuing inclination to construe such restrictions narrowly persists.[112]

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the future do not want to adopt an absolute restriction on transfer, or to leave the question to a future vote. They may prefer the option of exiting unilaterally, albeit at a significant discount to going concern value. The argument remains, however, that the participants must favor the additional hurdle placed by the right of first refusal, or they would have opted for a commitment to auction.

[109]A full history and analysis of judicial hostility to restraints on the free alienability of shares is beyond the scope of this Article. This brief synopsis is taken from O'NEAL & THOMPSON, *supra* note 3, §§ 7.06-7.07, which fully recounts the evolution of judicial and legislative approaches to close corporation share transfer restrictions. *See also* CLARK, *supra* note 3, at 763-64.

[110]*See* O'NEAL & THOMPSON, *supra* note 3, § 7.09, at n.1.

[111]*See* i*d*. § 7.06.

[112]*See* i*d*. §§ 7.09, 7.36.

In this environment the right of first refusal has developed as the tool of choice for shareholders wishing to restrict the free transferability of interests within the close corporation.[113]

It seems likely that it is the very fact that a right of first refusal appears to be innocuous, but in practice acts as a serious restraint, that has made the instrument an ideal choice for continuity minded co-venturers. This conclusion is supported by the following passage from the most recent edition of *Corbin on Contracts*:

> A contract that creates in B a Right of First Refusal for a definite period operates very little, if any, as a restraint on alienation by O. If O can find a buyer, O has the power to create a privilege to sell by merely offering to sell to B. If B accepts, a sale is consummated; if B does not accept, O is free to accept the buyer's offer. Although there is some authority otherwise, the preferable majority of courts hold that a right of first refusal is not an unlimited restraint on alienation and is not violative of the rule against perpetuities. *Rather than restraining alienation, the right enhances it by providing two buyers when property is sought to be sold.*[114]

The attitude reflected in *Corbin* and elsewhere is that the right of first refusal merely gives the insiders a "last look." The seller is free to dispose of his shares at any time. But, as we have seen analytically and as practitioners report anecdotally, the right of first refusal significantly restricts alienability. Because a commitment to auction sufficiently guarantees the remaining co-venturers an opportunity to retain control of the property, it appears that the primary motive for the adoption of a right of first refusal is to inhibit insider exit.

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[113]*See* i*d*. § 7.09 ("the form of option most likely to receive judicial support is a right of first refusal").

[114]CORBIN, *supra* note 2, § 11.3, at 484-85 (emphasis added, footnotes omitted).

VI. THE RIGHT OF FIRST REFUSAL OUTSIDE THE CO-VENTURING CONTEXT

A desire to inhibit exit and preserve the status quo seems a plausible explanation for the adoption of rights of first refusal by the shareholders of a close corporation or by other co-venturers, but this justification does not translate very well into the unilateral right of first refusal context. A lessee or franchisee, for instance, may have some interest in locking in the current relationship, but his power to do so is quite limited. It is conceivable that a tenant entering a lease may have less of an interest in acquiring the property midway through the lease term than in retaining his current landlord for the full term, and for that reason might prefer a right of first refusal to a commitment to auction.[115] However, this lock-in gain appears minimal since a successor landlord would be committed to continue the lease through its term, and the current landlord could sell the property unencumbered at the end of the lease.[116] At the least, then, we must supplement the status quo preservation explanation in the unilateral right of first refusal scenario.

This Part examines a number of alternative or supplemental explanations for the adoption of rights of first refusal in unilateral cases. Section A argues that the greater fungibility of some commercial property and the prospect of a large number of bidders reduce, but do not eliminate, the cost of the right of first refusal. Primarily because the parties must price the instrument in the unilateral case, Section B discounts inadvertence as a key factor in the right's adoption. Finally,

[115]The right of first refusal would tend to discourage bidders and to reduce the landlord's realization on sale, thus inhibiting sale by the landlord within the term of the lease.

[116]Recall that the typical unilateral right of first refusal runs only for the term of the underlying arrangement, in this case the lease. *See supra* Part I.C.2.

Section C suggests that adoption of unilateral rights of first refusal may reflect an instance of suboptimal standardization of contract terms.

A. Fungibility and the Number of Potential Third-Party Bidders

The cost disadvantage to an owner of granting a right of first refusal to purchase a property, instead of committing to auction, may be minimal in the case of relatively fungible commercial property which would draw the interest of a large number of third-party bidders. As shown above, the cost of the right of first refusal arises from dissuading potentially high-valuing bidders. If the potential bidding universe included no more than one outside bidder, the instrument would not be more costly to the contracting parties than a commitment to auction.[117] Similarly, if a significant number of high-valuing outside bidders remain interested despite the right of first refusal, then the cost is negligible, particularly if the most highly valuing bidders persevere. Intuitively, one would expect that the bidders most readily discouraged by the right of first refusal would be the relatively lower valuing parties. Thus, if ten parties were interested before learning of the right of first refusal, and five withdrew thereafter, we might expect little reduction in the seller's potential realization.

The contracting parties face the largest risk in adopting a right of first refusal in cases in which a relatively small universe of potential bidders may be eliminated or reduced to one by the instrument. A relatively unique asset, such as close corporation shares, would appear to fall into this category, as bidders will be difficult to find for the shares in the best of circumstances. Some fungible commercial property, however, may more closely resemble the case in which ten potential bidders drops to five in the face of a right of first refusal. If at the time of contracting it

[117] *See supra* Part II.C-D.

is at all predictable which category an asset will fall into, this phenomenon could help explain the persistence of rights of first refusal in some unilateral commercial property cases.[118]

This argument suggests that less of a status quo-preservation motivation is needed to justify the cost of a right of first refusal when a sizable number of third-party bidders can be expected in spite of the instrument. If, however, there is essentially no motivation to inhibit exit, as often will be the case in lessee/franchisee situations, why should the contracting parties accept even a small incremental cost given the option of committing to auction?

B. Inadvertence and Pricing the Right of First Refusal

Because preservation of the status quo is less desirable and less feasible in unilateral right of first refusal cases, the instrument usually will be less important to the contracting parties than it is in the reciprocal context. One might be tempted to suggest, therefore, that the parties in the unilateral cases simply are not paying much attention to the provision. However, even if a term is relatively unimportant, we normally expect contract law to evolve to an efficient structure.[119] Moreover, the need to price the term in the unilateral context should draw the parties' attention to it.

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[118]A lessee or other grantee of a unilateral right of first refusal on fungible property also may be less likely to place idiosyncratic value on that property. *See supra* note 43 and accompanying text. Although this fact alone would tend to reduce the cost of the right of first refusal by dissuading fewer third-party bidders, the value of the right to the grantee is reduced as well. In this case the right of first refusal is simply less important. But the fact that the right is less important does not, without more, justify suboptimal contracting. By contrast, the argument above is that even if a rightholder places a high idiosyncratic value on a property (perhaps because goodwill is critical in a particular neighborhood business), the cost of the right is reduced if the property is sufficiently fungible to attract a number of high-valuing bidders.

[119]The next Section suggests, however, that suboptimal standardization of the right of first refusal term may have blocked evolution to the efficient term for unilateral contracts.

Although providing insurance to the rightholder, the right of first refusal decreases the expected realization from the sale of the property. Moreover, as I noted earlier, the instrument serves to shift value from the seller to the rightholder. Thus far, I have ignored this second effect, assuming that the parties to the right of first refusal contract can allocate any costs between themselves ex ante. Interestingly, cost allocation poses less of a problem for co-venturers than it does for lessors and lessees. In the case of co-venturers each participant grants and receives the right from the others. Cases may arise in which it appears likely that a particular partner will be the first to sell, but generally it will be anybody's guess as to who will assume the seller and rightholder roles. In the case of equal partners the value transfers offset one another, thus eliminating the need to price the instrument ex ante. The partners may all be worse off, but they are equally worse off.[120]

The unilateral grant of the right in the case of the lessor and lessee is more complex, however. A lessee may want to have a right of first refusal even if the possibility that the lessor will decide to sell during the lease term is remote. Unless the lessor believes the chance of sale is negligible, however, he should only grant the right if he can recover the expected cost through higher rent or other concessions from the lessee. Intuitively, one would think that the need to price the right of first refusal ex ante would tend to alert the parties to the unilateral contract to the costs, whereas this factor would tend to make the instrument more invisible to the reciprocating co-venturers. Of course, it is possible that the low probability of triggering and the relatively low cost in the unilateral case leads to nonchalant pricing. In other words, the grantor

[120]Even if the interests held by the parties to a reciprocal arrangement are not equal, no pricing issue arises if we assume that the costs and benefits of the right of first refusal are proportional to the size of each party's interest.

may not evaluate the potential cost in any detail but may simply trade the right for a minor concession by the grantee.[121]

C. Suboptimum Standardization of Contract Terms

If inhibiting exit does not motivate the adoption of rights of first refusal in most unilateral situations, one would think that in an efficient world the parties to these agreements would instead utilize a commitment to auction to provide low-cost insurance against bargaining breakdown, while co-ventures who desire continuity within their membership would continue to adopt rights of first refusal. The theory of network externalities and suboptimum contract standardization may best explain why such bifurcation has not occurred.[122] Contract drafters always face the options of formulating unique terms or adopting previously used provisions.

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[121]The "negotiation" in which Pabst Brewing Company granted Pincus, a senior executive, a right of first refusal on the sale of a subsidiary company he managed exemplifies the lack of thorough evaluation that often underlies these arrangements. Judge Cummings described the proceedings as follows:

> At that time Pincus was president of Pabst's non-beer subsidiaries, which included both PMP and PL. Negotiations for the sale of PL were still in progress when August U. Pabst, executive vice president of operations for the brewery that bears his family name, met with Pincus regarding his future with Pabst. The two men discussed an arrangement under which Pincus would resign as president of PL, but remain president of PMP and assist Pabst in negotiating the PL sale. Pincus' salary and benefits would not change. Pincus asked Mr. Pabst if, as part of this arrangement, he could have a right of first refusal to purchase PMP, which manufactured and sold industrial fermentation products. After conferring briefly with William F. Smith, president and chief executive officer of Pabst, Mr. Pabst agreed to grant that prerogative to Pincus. Pincus' attorney drafted a concise, one-page document, which was signed by both sides within hours after the meeting.

Pincus v. Pabst Brewing Co., 893 F.2d 1544, 1546 (7th Cir. 1990).

[122]*See generally* Marcel Kahan & Michael Klausner, *Standardization and Innovation in Corporate Contracting*, 83 VA. L. REV. 713 [hereinafter Kahan & Klausner, *Standardization*]; Marcel Kahan & Michael Klausner, *Path Dependence in Corporate Contracting: Increasing Returns, Herd Behavior and Cognitive Biases*, 74 WASH. U. L.Q. 347 [hereinafter Kahan & Klausner, *Path Dependence*].

Adopting a standard term, however, allows the contracting parties to take advantage of past interpretations of that term. The parties also gain if future contracts adopt the same term and contribute to the wealth of interpretation and precedent.[123] The incentives to following standard terms are several.

1. Drafting Efficiency and Effectiveness. The adoption of industry boilerplate decreases the actual cost of constructing the document and reduces the chance of overlooking a contingency or allowing other errors to creep into the provision. Given the contingent nature of the right of first refusal, the investment that would be required to draft a commitment to auction may not be warranted. More importantly, although I have argued that the auction instrument is not conceptually very different from the right of first refusal, details of the commitment to auction would have to be worked through carefully to avoid ambiguities, provide for all contingencies, and ensure an error-free document. Moreover, even if the provision is expertly drafted, certainty is reduced until the device is used and litigated.[124]

2. Judicial Precedent. Given the historical hostility of courts to restraints on alienability and their continuing inclination to construe such restraints narrowly, the certainty-inducing value of precedents upholding specific right of first refusal provisions is particularly high. As courts now view rights of first refusal as relatively benign and as they are reinforced in that view by

[123]*See* Kahan & Klausner, *Standardization, supra* note 122; Kahan & Klausner, *Path Dependence, supra* note 122. The authors refer to the benefits derived from past contracts as learning benefits and those from future contracts as network benefits. The categories of benefit discussed below follow from these articles.

[124]Analytically a commitment to auction is less restrictive than a right of first refusal. Nonetheless, the expected cost of a drafting error or overlooked contingency may be particularly high in constructing restraints on alienability given the courts' continuing inclination to construe such provisions strictly.

statutes expressly authorizing their use among shareholders, it is likely that the instrument will continue to be used and that more useful precedent will evolve.

3. Industry Familiarity. Rights of first refusal are familiar to business professionals. The full economic implication of these instruments often may not be thoroughly considered, but what they do, how they work, and the fact that they are accepted and acceptable are well understood. This familiarity reduces the associated cost of the future services of lawyers, bankers, and other professionals. Further, even if a potential buyer of the encumbered property must overcome the right of first refusal hurdle, at least the buyer is dealing with a known commodity. A commitment to auction may be less onerous, but its adoption would involve some investment in explanation and understanding. Perhaps most importantly, the right of first refusal is familiar to the other parties to the contract. Perversely, in my view, a lessee may find it easier to convince a lessor to grant a "boilerplate" right of first refusal than to adopt a newfangled commitment to auction.

4. Existing Diversity of Alienability Restraints. One problem with the suboptimum-standardization-of-contract-terms argument, however, is the need to explain the existing diversity in restrictions on alienability. Although rights of first refusal appear dominant, rights of first offer, commitments to negotiate, and variations on these devices abound. Why would diversity extend as far as it has but not evolve to encompass commitments to auction, if such commitments are indeed optimum for parties seeking to prevent bargaining breakdown in lease, franchise, and other unilateral situations?

We cannot be sure, of course. We can speculate that commitments to negotiate, for example, which do not effectively prevent bargaining breakdown, serve a very different niche in the contracting market than do rights of first refusal, and thus have had the critical mass

necessary to have generated an independent standard term. More generally, the theory presented above only asserts that standardization provides certain efficiencies. If the economics driving contracting parties to diversify is sufficient, the standardization compulsion will be overcome and diversity will result. As we have seen, however, the right of first refusal generally is less important in unilateral cases and the incremental cost imposed on the contracting parties is reduced. Here the driving force to diversify simply may be lacking.[125]

VII. IMPLICATIONS

The primary goals of this Article have been to examine the economic effect of the right of first refusal and, by so doing, to explain the true purposes served by the device. I have few normative prescriptions for contracting in the private sector. Although family-held corporations cause one to pause, I believe that private contracting in the commercial sector is generally efficient. The first Section of this Part, therefore, is limited to a few thoughts on the flow of information and the possibility of overcoming network externalities in private contracting. I am less optimistic about the efficiency of contract terms imposed on parties by legislative mandate, however, and the second Section suggests that legislatures generally should refrain from mandating true rights of first refusal.

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[125]Kahan and Klausner also suggest that agency problems and cognitive biases may contribute to suboptimum standardization. *See* Kahan & Klausner, *Path Dependence*, *supra* note 122, at 353-65. An agency problem may arise if a risk averse attorney prefers the more certain boilerplate term to the riskier, although perhaps incrementally superior, uniquely drafted term. Unless a party to a right of first refusal is a frequent player, however, it is not clear that the client will be any less risk averse than his attorney. Cognitive biases that may figure into the standardization of suboptimum terms include status quo bias, a reluctance to depart from the norm; anchoring bias, the tendency of people to be influenced by reference points; and conformity bias, which reflects the influence of peers. The authors merely suggest these cognitive biases as possible supplemental explanations for suboptimum standardization, and I do the same.

A. Private Contracting

Unless undermined by imperfect information, private contracts are presumed to be efficient.[126] Rights of first refusal are almost always negotiated among a limited number of parties, and, thus, information acquisition and processing should not be hindered by collective action problems.[127] Nonetheless, given the apparent innocuous nature of the term, it is important that each party realize that the right of first refusal provision is not harmless boilerplate. Practitioners have long realized the significance of the restraint created by the right of first refusal. Hopefully, this Article will assist lawyers in explaining the term and its impact to their clients.

Rather than automatically adopting a right of first refusal provision, contracting parties and their attorneys should consider the objectives to be served by the restriction. If continuity among the participants is an important goal of the contracting parties, as it often will be in close corporations, the right of first refusal may be a good fit. If, however, the parties prefer free transferability and simply seek to insure against bargaining breakdown, a commitment to auction should be considered. In many instances the significance of the provision will be insufficient to justify the crafting cost and incremental risk associated with the adoption of a unique term, but exceptions may arise.

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[126]Moreover, these efficient contracts are presumed to be socially optimal in the absence of externalities. *See* Lucian A. Bebchuk, *The Debate on Contractual Freedom in Corporate Law*, 89 COLUM. L. REV. 1395, 1404-07 (1989); Kahan & Klausner, *Path Dependence*, *supra* note 122, at 347. Aside from the network externalities discussed below, the right of first refusal does not appear to produce externalities. The additional cost incurred by the third-party bidder should be fully absorbed by the contracting parties.

[127]Compare the creation of the contract that is the public corporation's charter. Rationally apathetic investors will not assess every minor term of the charter, and other mechanisms must be relied upon to ensure efficient charter formation. *See* Bebchuk, *supra* note 126, at 1407.

As noted above, optimum private contracting may be hindered by network externalities. If rights of first refusal and their kin are entrenched and overused because of network externalities,[128] contract diversity could be facilitated by the promulgation of a model commitment to auction.[129] Legislatures could further assist private contracting by adding the commitment to auction to the list of permissible restrictive devices in state close corporation statutes, although, as we have seen, rights of first refusal may remain dominant in close corporation agreements due to the shareholders' preference for continuity in the membership.

B. Statutory Grants of Rights of First Refusal

Given the deleterious but obscure impact of the right of first refusal on the value of encumbered property, the statutory grant of such rights is particularly troubling. If a legislature believes it necessary to provide any such protection, a commitment to auction should be utilized.

Although the large majority of rights of first refusal are created by private contract, it was noted in Part I that such rights increasingly are being granted by statute. While some may question the efficiency of contracting between private parties, there is not even the illusion of a market check on these public grants. Legislatures may believe that the rights they are granting

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[128] *See supra* Part VI.C.

[129] Although there can be no assurance of optimal contracting, a standard setting group promulgating model contract terms could promote a useful balance between uniformity and diversity of terms. Compared with the creation of unique terms, private contracting parties adopting model terms face reduced development costs and lower risks of formulation error. *See* Kahan & Klausner, *Standardization, supra* note 122, at 762. In the case of suboptimum technological standards reached through path dependent behavior, unwinding the standard ex post can be inefficient. A different standard or diverse standards might be socially superior, but given a sizable installed base switching costs may outweigh the inefficiency. Because contract term efficiencies are less dominated by external effects, one suspects that diversity generally could be injected into suboptimally uniform contract terms without negative effects.

are innocuous or that they only transfer value from grantor to grantee. Thus, providing a right of first refusal may seem like a cheap way of satisfying a disgruntled constituency. As the following examples demonstrate, however, where true rights of first refusal are mandated, this assumption may be quite mistaken.

1. Condominium Conversion Statutes. Some statutory rights of first refusal cause little economic harm. The rights associated with condominium conversions usually fall into this category.[130] Although the term "right of first refusal" is invoked, the typical statute creates a right of first offer in which the owner proposes a price to the rightholder. Generally, after giving the tenants a certain term to purchase, these statutes place a short term moratorium (perhaps 90 days) on the sale of a unit to the general public for less than the price offered to tenants. The statute certainly limits the owner's freedom of alienation, but, assuming the owner can reject financially unqualified applicants, the real burden is minimal. If the owner wishes to negotiate with third parties below the list price offered to tenants, the owner need only make the offer to the tenants well before he plans to go public. At most, the statute delays the owner for a few months.[131]

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[130]*See, e.g.*, VA. CODE ANN. § 55-79.94 (Michie 1997).

[131]Two other statutory right of first refusal grants that appear toothless, but if written more tightly could have been quite onerous, are the Petroleum Practices Marketing Act, 15 U.S.C. § 2802 (1997), and a Florida statute regulating the sale of mobile home parks, FLA. STAT. ANN. § 723.071 (West 1997). The Petroleum Marketing Practices Act [PMPA] governs the relationship between gas station franchisors and franchisees and places restrictions on the termination and nonrenewal of certain franchise agreements. Certain agreements must be renewed unless one of the enumerated grounds for nonrenewal is met. Most of the grounds involve franchisee misconduct, but sale of the premises is another valid ground for nonrenewal if the franchisor either 1) makes a good faith offer to sell the station to the franchisee or 2) provides a right of first refusal on an offer received from a third party and the franchisee declines to purchase on the terms offered. Franchisors wishing to sell should not be seriously hindered by this statute. Essentially, a franchisor desiring to sell one or more stations would be in the same

For a number of reasons a true right of first refusal or even a commitment to auction would be particularly onerous in the condominium conversion scenario. First, buyers of residential real estate are unaccustomed to dealing with such instruments, and most potential buyers would not accept the time delay without a significant discount. Second, unless the right was particularized to a single unit, numerous tenants would have the right to match the offer, and some priority mechanism would have to be developed. Finally, the costs of managing such rights on numerous, relatively small transactions would be preclusive.

2. Rights of First Refusal on Foreclosed Farm Property. The legislatures of a number of midwestern states have granted rights of first refusal to the former owners of foreclosed farms.[132] Although some of theses statutes are ambiguous and may be circumvented,[133] others expressly require a lending institution in possession to follow the classic right of first refusal

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position as the apartment owner described above. The franchisor must make a good faith offer to the franchisee, but if this offer is rejected the property is unencumbered. If the franchisor receives an unsolicited but acceptable offer from a third party despite the right of first refusal, all the better. He accepts the price from his franchisee or the third party. The statute is more problematic for the owner of a network of stations who wishes to fashion an attractive package deal. That franchisor must make individualized offers to his franchisees and accept the fact that the package will not include any stations are purchased. Nonetheless, the right of first refusal provision in the PMPA is not terribly onerous.

As interpreted, the Florida statute granting mobile homeowners' associations rights of first refusal on the sale of their parks is even more toothless. First, as in the condominium conversion case, the primary requirement is that an owner wishing to sell first must offer the park to the association, and the owner is then prohibited from "offering" below that price without retriggering the right of first refusal. Second, the owner is only obligated to notify the association before accepting an unsolicited offer for the property. Although it seems absurd that an offering owner could accept a lower counteroffer without retriggering the right of first refusal in the association, given the second provision, this point is far from clear. *See also*, Keenan, *supra* note 3.

[132]*See, e.g.*, IOWA CODE ANN. § 654.16 (West 1997). *See also* Houser, *supra* note 3 (reviewing and criticizing state statutes); Lawless, *supra* note 3 (reviewing state statutes and criticizing procedural debtor relief generally).

steps in disposing of the property. In other words, the bank is required to negotiate a price with a third party, transmit that offer to the former owner, and sell to the former owner on those terms if the former owner so elects. The bank may consummate the sale to the third party only if the former owner declines to exercise his right. Such a statute transfers value from bank to farmer and depresses the expected value of the farmland in a sale, and this appears to be a case in which the impact of the right of first refusal is significant. Farmland in general is fairly fungible, but failed farms are likely to lack economies of scale or be otherwise disadvantaged. Thus, the number of uninhibited bidders interested in foreclosed property may be small to begin with and the impact of dissuading bidders significant. As in the close corporation example, then, the result may be to severely restrain alienation, or in this case to confine the bank to resale to the former owner, at least in those cases in which the former owner can raise sufficient funds.

Perhaps this result is exactly what the legislatures intended. The legislative histories speak generally of concern for the welfare of farmers and preservation of family farms, and some of these states have enacted more serious restraints on alienation in the past, such as moratoria on foreclosures. However, if the legislatures were attempting to avoid the inevitable effect of severe restraints, such as tighter lending policies and higher loan rates, and simply ensure that the farms would not be sold to third parties without the former owner having an opportunity to repurchase, mandating a commitment to auction would have been a superior method to achieve that goal.

CONCLUSION

Rights of first refusal are costly to the contracting parties. At the time of sale a third party may place the highest value on the encumbered property. By reducing a third party's expected gain and thus deterring potential outside bidders, the instrument reduces the seller's realization

[133] *See* Houser, *supra* note 3, at 907-14.

potential. The impact is most significant when, as in the case of close corporation shares, the property is relatively unique, an insider is likely to place an idiosyncratic value on the interest being sold, and third-party bidders would be scarce even without such a restriction.

Rights of first refusal do avoid the possibility of a breakdown in bargaining between a seller and an inside bidder. Often where we encounter rights of first refusal both the risk and potential cost of such a breakdown are high. The potential cost is great because, at the time of the sale, an insider may place a very high value on the property. The risk of breakdown is high due to the likelihood of strategic bargaining, equity barriers, asymmetric information as to the magnitude of the insider's idiosyncratic value, and soured relationships.

If the parties simply seek to insure against bargaining breakdown, however, the adoption of a right of first refusal carries too great a cost. The same insurance can be provided at a lower cost by adopting a commitment to auction the property. An auction device can be designed that is surprisingly similar to the right of first refusal in implementation, that guarantees that an insider will prevail if he places the highest value on the property, but that also levels the playing field for outside bidders. We cannot measure the cost differential between the right of first refusal and the commitment to auction, but if the goal is simply to insure against bargaining breakdown, why would the parties accept *any* additional cost?

I have argued that there must be another goal, that the contracting parties, particularly in reciprocal arrangements, want to discourage each other from unilaterally exiting the venture. The participants do not simply want the option to buy the interest of a departing member; absent mutual agreement, they prefer that no one leaves. Depressing the potential realization of a party that is considering selling out places a hurdle on exit which may be quite significant in the case of a close corporation or other reciprocal relationship. The right of first refusal, then, serves as a

serious, but somewhat veiled, restraint on alienation that is acceptable to the parties, to the courts, and to legislatures. Although this explanation seems persuasive in the co-venturing context, it is less compelling in the context of unilateral grants of rights of first refusal, where the desirability and feasibility of locking the participants into the venture often are lacking. Here something of a mystery remains, but I have suggested that the incremental cost of the right of first refusal is less in the case of unilateral grants and may be insufficient to overcome network externalities.

Normatively, I see no reason not to defer to the informed contracting preferences of private parties adopting rights of first refusal or similar restraints. If parties wish to bind themselves to the continuation of an enterprise, they should be free to do so. However, I hope that this Article will add to a fuller understanding of the impact of the right of first refusal device, and will encourage attorneys and their clients to consider whether adopting this boilerplate term best serves the parties' intended purpose or whether a less costly commitment to auction would suffice. I have argued that legislatures should be particularly cautious in granting rights of first refusal and should consider requiring paper auctions instead, if the legislative goal is merely to ensure that a certain party has a fair opportunity to bid. We should question the rationale behind legislative decisions that go further and mandate true rights of first refusal.

Appendix -- Bidder's Expected Gain at Auction and Under Right of First Refusal

General Assumptions: V_B=100, V_{RH}(mean)=100, V_{RH}(std. dev.)=5, V_{RH} is normally distributed.

Auction Assumptions: Bidding in increments of 1, Bidder begins at 81.

Bidder's Bid	Gain on Success	V_{RH} of Success	V_{RH} Std. Dev.	V_{RH} Prob.	Bidder's Gain X Prob.
81	19	<82	<3.6	.00016	.00304
83	17	82-84	3.2-3.6	.00053	.00901
85	15	84-86	2.8-3.2	.00187	.02805
87	13	86-88	2.4-2.8	.00564	.07332
89	11	88-90	2.0-2.4	.01455	.16005
91	9	90-92	1.6-2.0	.03205	.28845
93	7	92-94	1.2-1.6	.06027	.42189
95	5	94-96	0.8-1.2	.09679	.48395
97	3	96-98	0.4-0.8	.13272	.39816
99	1	98-100	0.0-0.4	.15542	.15542
				Expected Gain:	**2.02 or 0.4 sigma**

Right of First Refusal
Procedure: Select bid that maximizes product of probability of success and gain.

Bidder's Bid	Gain on Success	V_{RH}(mean) - X sigma	Prob. of Success	Bidder's Gain X Prob.
96	4	.80	.21186	.84744
96.05	3.95	.79	.21476	.84830
96.1	3.9	.78	.21770	.84903
96.15	3.85	.77	.22065	.84950
96.2	3.8	.76	.22363	.84979
96.25	**3.75**	**.75**	**.22663**	**.84986**
96.3	3.7	.74	.22965	.84971
96.35	3.65	.73	.23270	.84936
96.4	3.6	.72	.23576	.84874
96.45	3.55	.71	.23885	.84792
96.5	3.5	.70	.24196	.84686

Probable gain maximized at V_{RH}(mean) - .75 sigma; 23% chance of success; expected gain of .85.

Right of First Refusal (ROFR) Effects in Auctions with Reserve Price: Empirical Evidence from Taiwanese Government Land Auctions

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Abstract

The *right-of-first-refusal* (ROFR) granted by the seller to a buyer that allows the favored buyer to purchase the asset at the highest price the seller can obtain from other competing buyers is common in auctions and other economic transactions. Yet the predictions of the theory on the impact of this hybrid mechanism on auction outcomes have not been tested using real-world transaction data. Hence, our knowledge of the practical economic impact of this hybrid auction that decouples price formation and allocation on bidder behavior and ultimately expected seller revenue and profit is quite limited. This paper presents the first empirical evidence on the effects of ROFR from 1012 first-price sealed-bid auctions for the sale of government owned land in Taiwan from 2007 to 2010. The main findings are as follows. An auction with the ROFR has significant negative effect on auction success, i.e. it decreases the likelihood of asset sale. Further, we find that the presence of ROFR in an auction: (i) discourages bidder entry into auction, (ii) creates incentive for bidders to bid less aggressively, and (iii) ultimately reduces seller expected revenue and profit. Interestingly, in majority of the margins of auction outcomes we analyzed the reserve price tends to offset the effects of the ROFR, and the ROFR in turn has significant negative effect on the level of reserve price set by the seller. Overall, the weight of our empirical evidence provides support for the branch of the theory that predicts negative impact of ROFR on auction outcomes.

JEL Classification: D4, D44, D47, L11, D82, R3

Key Words: auctions, right-of-first-refusal, mechanism design, reserve price, real estate

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Introduction

A recurring theme in the auction literature is how auction design itself affects the margins of auction outcomes (Vickery [1961], Myerson [1981], and Engelbrecht-Wiggans [1987]). More specifically, attention has focused on how an auction should be designed to maximize seller expected payoff. In this context, an extant issue of great interest in the economics of applied auction design centers on the *right-of-first-refusal* (ROFR), an auction policy tool that allows the holder of the right to subsequently win the auction and acquire the asset simply by matching the highest bid of the other competing bidders in the auction.[1]

An auction with ROFR is interesting especially when compared to a standard auction where the winner of the auction is *ipso facto* the highest bidder. Unlike a standard auction an auction with ROFR does not commit the auctioneer (seller) to selling the asset to the highest bidder (or purchasing from the lowest bidder in case of procurement auctions). Essentially, auctions with ROFR decouple price discovery (the bids received) from allocation of the asset. This implies that the final winner is at the discretion of the seller and may not necessarily be the bidder with the highest valuation. At issue is how this applied auction design impacts entry into auctions, bidders' behavior and ultimately seller expected revenue and profit. These are important empirical questions whose relevance transcends the immediate confines of auctions with ROFR to include the class of applied auction design that combine the market competition of pure auction and a non-competitive arrangement to determine the ultimate auction winner.[2]

In this paper, we focus on the effects of auctions with ROFR on margins of auction outcomes. It is worth emphasizing that in this hybrid mechanism the auction itself does not determine the winner; rather the auctioneer uses the price set by the auction to exert some control over who gets to be the ultimate winner. Although an auction with a ROFR is a form of favoritism bestowed the "favored" bidder, it is frequently found in a variety of economic transactions. It is often utilized in procurement auctions to award government contracts and by firms buying

[1] Although, it is tempting to think of the ROFR clause as akin to a regular option, conceptually it is different. Unlike a true option the time to exercise the ROFR is purely at the whim of the seller (not the right holder) as determined by the receipt of a bona fide offer from a competing bidder in the auction.

[2] In a procurement process, Englebrecht-Wiggans and Katok (2004) examine theoretically and in laboratory setting the performance of a hybrid mechanism that combines an auction with a non-competitive sales contract. They find that this hybrid mechanism reduces the buyers cost relative to a pure standard auction. They stress that this cost reduction endures without considering the potential benefits from establish long-term relations between the buyer and the supplier.

inputs, where in this case the auctioneer is seeking a low price rather than a high price[3]. Other economic transactions involving vast amount of money, for example transactions on interests in partnerships and closely held corporations[4], real estate[5], professional sports contracts [6], entertainment contracts [7], and venture capital financing are commonly consummated using an exchange mechanism with the ROFR. In all these economic transactions, at least one "favored" bidder (the right holder) has distinct comparative advantage over other bidders.

The prevalent use of the ROFR in economic transactions has spawned a burgeoning theoretical literature (which we review below) that provides predictions of the effects of this auction policy tool on the margins of auction outcomes.[8] Although the theory has been important in developing our understanding of this hybrid auction mechanism, it nevertheless offers competing predictions regarding its effects on auction outcomes. Remarkably, the competing and often conflicting predictions of the theory of the effect of ROFR have not been empirically tested using real-world transactions data.[9] Hence, the practical impacts of this

[3] The National Park Service (NPS) has used the right-of-first-refusal to auction concession contracts on Federal lands since 1965. Concession contract is big business producing gross revenue of about $2.2 billion in 1994. In 2000 the NPS withdrew the right from all incumbent concessioners grossing $500,000 and above based on several General Accounting Office reports alleging that the right has detrimental effect on competition and revenue to the federal government.

[4] It is a common feature in contracts for the eventual dissolution of business (See Brooks and Spiers, 2004)

[5] ROFR is often found in real estate transactions either in the form of contractual clause or by legal statute. For example in the District of Columbia the Tenant Opportunity to Purchase Act gives the tenant ROFR when the owner wants to sell the property. Similarly, in both Britain and France property laws protect the tenant by granting her the ROFR in the sale of the rental property. Grooskopf and Roth (2005) analyze Britain's Landlord and Tenant Act of 1987 that stipulates that tenants of flats in England and Wales have the right to purchase their flat before the landlord can offer it to a third party. They find that the specific characteristic of the right can work to disadvantage the right holder

[6] In the National Football League (NFL) the incumbent team has the right to match the best offer a player has from another team to retain the player once he becomes a restricted free agent.

[7] In 2001 Paramount Studios, the producer of the successful TV show *Frasier*, renegotiated its expired contract with NBC, where NBC, as the incumbent network at the time held the ROFR. NBS was given 10 days to match the terms offered by CBS (See Grosskopf and Roth 2009)

[8] One conventional justification offered for granting ROFR in economic transactions is that it serves to level the playing field between a weak bidder and a strong bidder that is more likely to have a high valuation for the object (Lee, 2008). Yet another explanation for ROFR is to mitigate breakdown in bargaining and exit from a market (Walker 1999).

[9] In an experimental setting, Grosskopf and Roth (2005) find that the right may disadvantage the holder. Although their findings are insightful the experiment was based on a special type ROFR (a combination of right of first offer and right of first refusal) and instead of an auction they used sequential negotiation format.

auction policy tool on the outcomes of real-world economic transactions are still not well understood. Indeed, our knowledge of its practical economic effects is at best quite limited.

This paper contributes to the empirical auction literature by being the first to provide empirical evidence on the effects of the ROFR on auction outcomes from 1012 first-price sealed-bid auctions for the sale of government-owned lands in Taiwan conducted between 2007 and 2010. At a policy level, the motivation for our analysis is to provide empirical evidence regarding the impact of the ROFR on a rich set of auction outcomes aiming discriminate among the competing predictions highlighted by theory. Specifically, we use our unique data set to fill the empirical void by investigating the impact of auctions with ROFR on several margins of bidders' behavior and seller payoff expectations including: (1) the probability of auction success or asset sale, (2) the number of bidders that enter the auctions, (3) bidding behavior within the auctions, and (4) seller expected revenue and profit. Intuitively, since the auctions we analyze also uniformly employ the *reserve price* in combination with the ROFR, we provide insights on the determinants of reserve price set by the seller; in particular we shed light on whether the ROFR influences the level of reserve price set by the seller.[10]

Our key findings regarding the effects of ROFR on the margins of auction outcomes emphasized by theory are as follows. First, the ROFR has significant negative effect on the probability of auction success, i.e. it decreases the likelihood of asset sale. To the best of our knowledge this is the first direct empirical evidence of the negative impact of ROFR on auction success. Second, ROFR reduces the number of actual bidders that enter the auctions, creates incentive for bidders to bid less aggressively within auctions, which we find, ultimately reduces expected seller revenue and profit. These findings are the more economically important given that the vast majority of procurement auctions actually used in practice are hybrid mechanisms (like auction with ROFR) that decouple price formation and allocation, which creates flexibility for the auctioneer to accomplish other goals such as establishing long-term relationship.

Third, and interestingly, in all the standard margins of auction outcomes we investigate, except bidders' entry into auctions, the reserve price offsets, although partially, the negative effects of the ROFR. Fourth, the effect of the ROFR on auction outcomes is also sensitive to

[10] Lee (2008) argues that the ROFR and reserve price are complementary auction policy tools for reducing asymmetry (leveling the playing field) between weak bidders and strong bidders in certain situations. Further, the two auction policy tools may exhibit counterbalancing effects in terms of impact on auction outcomes.

market and asset characteristics such as location of the property to be auctioned and land use type. In this regard, there are important market dynamics and asset differences that affect entry into auctions and ultimately seller expected payoff, quite apart from those emanating from the ROFR and the reserve price. Finally, on the determinants of the reserve price, we find among other factors, the ROFR reduces significantly the level of reserve price set by the seller.

The empirical results are robust after controlling for possible endogeneity of the reserve price, and the *corner solution outcome* associated with response variables (dependent variable) in successful auctions.[11] Mapping our overall results back to theory, on the substantive issue regarding the effect of ROFR on auction outcomes, we can discriminate in favor of the branch of the theory that predicts that the ROFR will have negative effect on margins of auction outcomes including seller expected revenue and profit. Hence, the conclusion we draw from the empirical evidence is that it may not be in the best interest of the seller to grant the buyer *the-right-of-first refusal,* unless there is some upfront compensation from the right holder to the seller, or some other unstated objective such as using the mechanism to facilitate long-term relationship between the buyer and the supplier in procurement process.

Our work contributes to the empirical literature on the impact of auction design in several ways. First, we present for the first time empirical evidence from 1012 first-price sealed-bid auctions of the effects ROFR on several margins of auction outcomes that theory labelled but waiting for empirical validation. Indeed, as stated earlier there has been an upsurge of interest in theoretical work on the effect of auctions with ROFR, but this type of mechanism has not been analyzed empirically. Second, our findings shed light on the possible economic consequences of a class of hybrid auction mechanisms most often used in procurement practice that combine pure auction with non-competitive bidding to determine allocation. Hitherto our understanding of the economic effects of such auction mechanisms that favor a bidder(s) on auction outcomes is limited.

Third, this paper provides empirical evidence on the possible interactive or counterbalancing effects between the ROFR and reserve price highlighted in the theoretical literature. Specifically, we provide empirical support for the proposition that depending on the degree of asymmetry between a weak bidder (who is favored) and a strong bidder, the ROFR when

[11] For example, the optimal value for the response variable, winning bid, is zero with positive probability for some potential bidder, but is strictly positive and continues for other bidders.

combined with the reserve price, would tend to offset each other's effect on auction outcomes. Fourth, we also contribute to the growing empirical literature that investigates whether the behavior of bidders is consistent with standard auction theory. In this regard, we find empirical evidence consistent with auction theory in that higher reserve price discourages entry of bidders, but increases the winning bid and ultimately seller's expected revenue and profit. However, the reserve price is not independent of the number of bidders, contrary to prescription of theory. Further, the reserve price set by the seller correlates negatively with the ROFR. To the best of our knowledge this is the first empirical evidence of the impact of ROFR on the reserve price set by the seller.

The remainder of the paper is organized as follows. Section 2 briefly reviews the theoretical predictions of the effects of ROFR on auction outcomes. Section 3 discusses the institutional features of Taiwan government land auctions, and presents our analytical model of bidder behavior and seller expected payoff in the auctions. Section 4 describes the data and provides descriptive statistics on various dimensions of the sample. Section 5 discusses the results of our multiple regression analysis on the impact of the ROFR and reserve price on the margins of auction outcomes. Section 6 uses the results from this study to evaluate some major economic transactions that used the ROFR to accomplish the transaction, and the final section concludes with a summary and direction for future research.

2. Theoretical Background

Theory provides competing predictions regarding the impact of the ROFR on the margins of auction outcomes we analyze in this paper. Moreover, theory is essentially silent on whether the ROFR influences the level of the reserve price. For ease of discussion we have broadly grouped the theoretical coontributions into two: papers that predict granting the ROFR can increase the seller expected revenue or the joint profit of the seller and the right holder, and those that predict that the presence of ROFR in auctions reduces seller expected payoff or has negative effects on auction outcomes.

In a first-price procurement auction, Burget and Perry (2009) show that the expected joint surplus of the buyer and the seller is maximized if the seller is granted the ROFR than would be the case using a standard first-price auction. This result is conditional on the right being auctioned off to the highest bidder beforehand, which suggests that granting the ROFR for free never benefits the seller. Choi (2008) discusses the effect of ROFR in a modified two-bidder auction where the right-holder gets to observe the bid of the non-favored bidder

before making her own. He shows that when the favored bidder wins the auction, the ROFR increases the joint profit of the seller and the favored bidder at the expense of non-favored bidder. However, the paper also finds that ROFR may at times lead to inefficient allocation(decrease social welfare) because the favored bidder may win the auction even if her private valuation is less than that of the non-favored bidder.

A recent paper by Elmaghraby et al (2011) models the ROFR in a two-stage sequential auction with earlier release of information. They show that the seller can increase her revenue compared to a single auction or sequential auction executed without ROFR. However, as stressed by the authors this result hinges on information flow and the timing of its release. In a procurement setting, Lee (2008) models the effects of ROFR in a first-price sealed-bid auction with two asymmetric bidders, weak bidder and strong bidder. He shows that when the asymmetry between the weak bidder and the strong bidder is sufficiently large, granting the weak bidder the ROFR levels the playing field, thereby eliciting more aggressive bidding from the strong competitor, which maximizes the seller's expected payoff. Further, he concludes that at low to intermediate levels of asymmetry the reserve price offsets or neutralizes the effects of a ROFR. In an asymmetric procurement auction, Rothkopf et al (2003) find that offering some degree of favoritism to disadvantage bidders in the form of adjusted bids or subsidy generally benefits the seller. This is in the sense that the subsidy makes the economically disadvantage bidders more competitive, which in turn induces the other bidders to bid more aggressively thereby lowering project cost and enhancing economic efficiency.

Theoretical work that predicts negative impact of ROFR on auction outcomes or seller expected payoff includes the following papers. Atozamena and Weinschelbaum (2006), assuming independent private values (IPV), conclude that no auction mechanism that includes the ROFR is capable of maximizing the joint expected surplus of the seller and right holder. Moreover, such auction design would be suboptimal. Bikhchandani et al (2004) discuss the impacts of the ROFR on auction outcome in a second-price sealed-bid auction where bidders observe private signal about their valuations. They conclude that the ROFR is inefficient in that the bidder with the highest value does not necessarily win and it benefits only the right holder at the expense of the seller and other competing buyers. Moreover, when bidders' valuations are correlated, the ROFR exacerbates the winner's curse. Based on their results, Bikhchandani et al caution that sellers should exercise extreme caution when considering whether or not to grant the ROFR.

In a paper prompted by the decision of U.S. National Park Service (NPS) to eliminate the ROFR in some of its concession contracts, Chouinard (2005) concludes that the NSP is indeed better off without the ROFR in its concession contract auctions. Specifically, Chouinard shows theoretically that the expected value to the seller of a standard auction without ROFR exceeds that of an auction with ROFR. Kahan et al (2012) discuss the ROFR in a multiple-buyer sequential bargaining setting (not auctions). They find that the right not only transfers benefits from the other buyers to the right-holder, but may also force the seller to make suboptimal offers.

Overall, one proposition of theory is that when there is sufficient asymmetry of some form among bidders granting the ROFR to disadvantage bidders offsets the asymmetry, which presumably leads to positive impact on auction outcomes. An alternative conjecture is that when there is little or no asymmetry among bidders the ROFR imposes a constraint so that its presence in an auction negatively impact auction outcomes such as entry and ultimately seller expected revenue and profit. The competing hypotheses of the theory regarding the impact of ROFR as an auction policy tool makes the question of who wins versus who loses in auctions with ROFR an empirical one. We contribute to the auction literature by providing credible empirical evidence of the causal effects of ROFR on the margins of bidder behavior and seller expected payoff, and in the process discriminate among the competing predictions of the theory. Additionally, the theory stresses the interaction between the ROFR and the reserve price as auction policy tools for leveling the playing field between asymmetric bidders. We shed light on the nature of this possible interaction between the two auction policy tools as well as whether the ROFR influences the level of reserve price set by the seller.

3.0 Institutional Auction Background, Models of Bidder Behavior and Seller Expected Value

In this section, we first provide a description of the institutional setting of Taiwan auctions for sale of government-owned lands. Auctions have been used to sell several millions of square meters of government-owned land involving vast amounts of money. We use the knowledge gained to model bidder strategy and seller expected payoff in subsequent auctions aiming to capture the key institutional features of the auction design. In particular, the models of bidder strategy and seller expected revenue reflect the role of the two auction policy tools, ROFR and reserve price, on auction outcomes.

3.1 Institutional Background of Taiwan Land Auctions

Since 2002, auctions have been used to sell government-owned lands in Taiwan. The auction mechanism used is a first-price sealed-bid auction. An interesting feature of these auctions is that the ROFR is granted to some potential buyers of the property to be auctioned. As stated earlier this right allows the right-holder the opportunity to buy the property being auctioned simply by matching the highest price obtained by the government from a third party in the auction. In addition to the ROFR, another applied auction design uniformly found in the auctions is the *reserve price*, the price below which the government will not sell the real estate asset.

The Taiwanese ROFR is granted by legal statute as contained in various articles of the Land Act of 1930.[12] As prescribed by the relevant articles of the Act, the ROFR is invoked in the following situations: (1) sale or disposition by co-owner(s) of his/her interest in the co-owned property; (2) sale by landlord of a property under lease, and (3) sale of inherited property where private property right was vested in the government due to non-compliance with applicable provisions of the land law by inheritor(s). For example, article 34-1 that governs the sale of interest in co-owned real estate states:

> *"When co-owners dispose of their shares of ownership, other co-owners shall have [preferential right], individually or jointly, to purchase the said shares on the same terms as are offered to any other person"*

Similarly, article 104 of the Land Act that governs the sale or disposition of leased land or building states:

> *"When the building site is offered for sale, the lessee shall have preference right* (ROFR, emphasis ours) *to purchase it on the same terms as are offered to any other person, and when the house on the leased site is offered for sale, the owner of the site shall have [preferential right] to purchase it on the same terms as are offered to any other person"*

A natural question to ask is why the Taiwan Land act favors some potential buyers in economic transactions by granting them the ROFR. While the Land Act does not explicitly

[12]The Taiwan Land Act is a broad statute that inter alia governs all manner of property rights, restrictions on property rights, circumstances under which private land becomes vested in the government, land use type, situations that give rise to right-of-first-refusal in the sale or disposition of property rights, etc. Articles 34-1, 73-1, 104, and 107, respectively deal with right-of-first-refusal in connection with the sale of land or building under co-ownership, government owned land or land whereof private ownership is extinguished and vested in the government, leased land or building, and leased farm. The Act was first promulgated on June 30, 1930 and became enforceable on March 1, 1936. In nearly a century of its existence the Act has been amended ten times; the latest amendment occurred on June 15, 2011.

state the rationale or reason for granting the ROFR the common thread in all the cases where ROFR is invoked stems from ownership of some property right by the potential recipient of the right in the property being sold. The property right could be co-ownership right in a freehold interest, right of use or *usufructuary* right as in leasehold, and even an extinguished private property right that was vested in the government. In all these cases the Taiwan statutory ROFR explicitly gives the right holder a comparative advantage by allowing the right holder the opportunity to purchase the property being sold simply by matching the highest bid from other bidders. Further, in some situations especially in the case of sale of property under fractional co-ownerships the practice of granting the ROFR helps consolidate ownership under single entity. In this regard an inherent economic rationale for granting the ROFR is to preserve economies of scale in land resource utilization.

Periodically, branch offices of the National Property Administration of the Taiwan Ministry of Finance conduct public auctions for the sale of government-owned real estate for non-public use. Potential bidders must submit bids in prescribed form accompanied by a deposit (10% of the reserve price) in the form of money order or bank draft.[13] This payment allows bidders to determine their private valuation of the property being auctioned based on the information released by the administrative office and their own private information. The information released by a branch office includes reserve price, the presence or absence of the ROFR on the asset to be auctioned, location of the land, land area in square meters, floor area if there is a building on the land, and the date for the auction.

During the bid-tender period the administrative office conducting the auction is not permitted to open bids and is explicitly forbidden from revealing bid information. Bids are opened publicly on the day of the auction to determine the winning bid. The winning bid is the highest bid among all bids submitted. If there is more than one bid with the highest price, the winner is awarded by lottery. Then if someone holds the ROFR on the property to be auctioned the process enters its second stage where the holder of the right gets to observe the winning bid. If the right holder matches the winning bid she acquires the property at the winning bid. If not the non-favored bidder with the highest bid acquires the property and pays the winning bid price since this is a first-price sealed-bid auction.

[13] The deposit is refunded to losing bidders. The price paid by winning bidders is the winning bid minus the deposit. Consequently the real cost of participating in the auction is the opportunity cost of the deposit (or the interest forgone) and other associated cost of preparing bids and entering the auction. We do not model these costs.

The typical bidder or buyer in such auctions is a property developer buying the real estate for subsequent conversion into residential, commercial or mixed use and not for resale of the land acquired. Given the absence of resale motive *independent private value* (IPV) seems appropriate as paradigm governing the auctions for the sale of government land in Taiwan. Moreover, from an economic perspective, it is likely that ex ante bidders are asymmetric in terms of value proposition, expertise, and production efficiencies, relating to the ultimate *highest and best use* for the acquired real estate, further justifying the IPV assumption. Based on these arguments we consider asymmetric IPV in modeling bidder strategy and expected seller payoff in auctions with and without ROFR, where the seller imposes also the reserve price.

3.2 Modeling Bidder Strategy and Seller Expected Value

As the basis for our analytical model, we want to capture the essential institutional features of the setting for the Taiwan government first-price sealed-bid auction in which potential bidders know that at least one of the bidders is favored in some of the auctions. Specifically, we first model an equilibrium bidding strategy in which a favored bidder(s) is granted the ROFR by statute which gives her an opportunity to win the auction by matching the highest bid of a competing non-favored bidder. This setting implies that the favored bidder has the advantage of knowing the private bid of the non-favored competitor at some stage in the auction process. We then model and contrast this with the bidding strategy in a standard first-price sealed bid auction with no ROFR. From the equilibrium strategies we sketch out the seller's expected value under the auction with ROFR and under a standard first-price sealed bid auction with no ROFR. We then deduce which of the two auction designs result in higher payoff to the seller.

Our approach in modeling the bidder's strategy follows Chouinard (2005), Choi (2009) and Lee (2008). There are three risk-neutral profit maximizing players, a favored buyer (B_F) with a statutory granted ROFR, a non-favored buyer (B_{NF}) with no ROFR, and the government, the seller (S), who wants to sell an indivisible real estate asset. Each bidder has a private value v drawn independently and uniformly from a common distribution $F(\cdot)$ with density function $f(\cdot)$ and support [0, 1]. This information is common knowledge among the players. However, each bidder's value depends on the bidder's private information that is not known by the competing bidders.

A strategy for a bidder that maps her true value v to a non-negative bid b is a function $s(v)=b$. We make the following two assumptions about the bidder's strategy: (1) $s(\cdot)$ is a differentiable function that is strictly increasing, such that two bidders with different values will have different bids, and (2) $s(v) \leq v$ for all v, so that bidders can shade down their bids, but will never bid above their true values. Upon payment of a deposit both the favored bidder, B_F, and the non-favored, B_{NF}, learn their private valuations, v_f, v_{nf}, respectively. Prior to the start of the auction a reserve price or minimum bid, b_m, is announced by the auctioneer, and no bid below this minimum bid will be accepted. If there is no bid $\geq b_m$ the auction fails and the government retains the asset for a later auction.

3.2.1: Bidder Strategy in Auctions with ROFR

We envisage a two-stage first-price sealed-bid auction as follows: (1) B_{NF}, the non-favored bidder, bids b_{nf}; (2) the favored bidder observes b_{nf} and decides whether or not to match b_{nf}; and (3) B_F matches b_{nf} and acquires the asset at b_{nf}, otherwise B_{NF} acquires the asset at b_{nf}. In this setting, B_{NF} realizes that the only way she can win the auction is if her bid, b_{nf}, is greater than the valuation of the favored bidder, v_f. Otherwise the favored bidder will always win the auction by exercising her ROFR and matching b_{nf}. Then the expected profit of the non-favored bidder is $E(\pi_{nf}) = (v_{nf} - s(b_{nf}))P(b_{nf} > v_f)$, where $v_{nf} - s(b_{nf})$, is the surplus or profit from the auction and $P(b_{nf} > v_f)$ is the probability of winning the auction. In this regard the non-favored bidder's probability of winning in the interval [0, 1] is exactly b_{nf}. Now if B_{NF} does win, she receives a payoff of $v_{nf} - s(b_{nf})$. Taking all of these into account, the expected payoff for the non-favored bidder can be written as:

$$g(v_{nf}) = (v_{nf} - s(b_{nf}))b_{nf} \qquad (1)$$

From equation (1) the non-favored bidder's maximization problem is

$$\max_{b_{nf}} [v_{nf} - s(b_{nf})]b_{nf} \qquad (2)$$

Maximizing (2) subject to b_{nf} the first order condition is

$$v_{nf} - 2b_{nf} = 0 \qquad (3)$$

From equation (3) the solution for the optimal bid yields $b_{nf} = 1/2v_{nf}$. Thus the optimal strategy for the non-favored bidder knowing that she is competing with a favored bidder with private value drawn uniformly at random from the interval [0,1], is to bid half her true value, if the favored bidder is expected to do so as well. The non-favored bidder's complete optimal strategy, therefore is

$$b_{nf}(v_{nf}, b_f, b_m) = \begin{cases} v_{nf}/2 & if\ b_m \le v_{nf}/2 \\ b_m & if\ v_{nf}/2 \le b_m \le v_{nf} \\ 0 & otherwise \end{cases} \qquad (4)$$

The favored bidder, B_F, will maximize the expected value of winning in stage two of the process.[14] At this point the favored bidder knows b_{nf} and her own private value signal, v_f. The favored bidder will exercise the ROFR if conditional on her own value (v_f) and the non-favored bidder's bid (b_{nf}), her expected valuation is larger than the non-favored bidder's bid. Hence, the favored bidder's equilibrium optimal strategy is,

$$b_f(v_f, b_{nf}, b_m) = \begin{cases} b_{nf} & if\ b_m \le b_{nf} < v_f \\ b_m & if\ b_{nf} = 0\ and\ b_m < v_{nf} \\ 0 & otherwise \end{cases} \qquad (5)$$

Note that if the non-favored bidder bids an amount larger than the favored bidder's value, the favored bidder will not match; the non-favored bidder wins and the game is over. However, because the favored bidder simply has to match the non-favored bidder's bid she can win even with lower valuation as shown in the complete strategy of the favored bidder above. Since the favored bidder can win despite her lower valuation the ROFR creates inefficiency in allocating the asset to her, the size of which is given by $\int_{v_{nf}} \int_{v_f = b_{nf}(v_{nf})}^{vnf} (v_{nf} - v_f) f(v_f, v_{nf}) dv_f dv_{nf}$ (see Choi, 2009).

3.2.2: Bidder Strategy in Auctions without ROFR

In auctions without ROFR the bidders are somewhat symmetric as far as the auction design and we now assume that bids are submitted at the same time. It is well known in the auction literature that in a first-price sealed-bid auction with IPV and *n* bidders, the optimal strategy is to bid $s(v_i) = (n-1)/n \cdot v$, where v is the private valuation of the asset randomly drawn from the probability distribution function (see Milgrom (1987,1989), Milgrom and Weber (1982), McAfee and McMillin (1987), and Wofstetter (1996)). Hence, it is optimal for each bidder to shade her bid down by a factor of *(n-1)/n,* given that everyone else does the same. Under

[14] At this stage in the process the highest bid submitted by the non-favored bidder, b_{nf}, effectively becomes the reserve price faced by the favored bidder.

this circumstance the optimal bidding strategy for both bidders in our two-bidder scenario without ROFR translates to $s(v) = v/2$, i.e. each bidder should bid half her private valuation. Consequently, the complete bidding strategy for both bidders is

$$b_i(v_i, b_i, b_m) = \begin{cases} v_i/2 & \text{if } b_m \le v_i/2 \\ b_m & \text{if } v_i/2 \le b_m \le v_i \\ 0 & \text{otherwise} \end{cases} \qquad (6)$$

Note that this equilibrium bidding strategy is the same as that of the non-favored bidder in the case of an auction with ROFR and a reserve price described above. So the non-favored bidder's bid is the same as when confronted with a favored bidder with ROFR.

3.2.3: Seller Expected Value under both auctions

In the context of a first-price sealed-bid auction with ROFR the seller expected revenue depends entirely on the highest bid which in turn depends on highest value. Then the price received by the seller is always the non-favored bidder's bid (whether the favored bidder matches or not) and the expected revenue of the seller is solely dependent on the bid function of the non-favored bidder. And given that the highest bid represents how much the non-favored bidder is willing to pay for the asset, the expected value, $E(V_S)$, of the auction with ROFR to the seller can be written as[15]

$$\begin{aligned} E(V_S|ROFR) = &\left[(v_{nf}/2)P(b_m \le v_{nf}/2) + (b_m)P(v_{nf}/2 \le b_m \le v_{nf})\right]P(b_{nf} > v_f) \\ &+ \left\{ (b_{nf})P(b_m \le b_{nf} < v_f) + (b_m)P(v_{nf} < b_m < v_f) \right\}P(b_{nf} < v_f), \end{aligned} \qquad (7)$$

where, P is probability.

The expected value to the seller in the standard auction without ROFR can be written as

$$\begin{aligned} E(V_S|no\ ROFR) = &\left[(v_{nf}/2)P(b_m \le v_{nf}/2) + (b_m)P(v_{nf}/2 \le b_m \le v_{nf})\right]P(v_{nf} > v_f) \\ &+ \left\{(v_f/2)P(b_m \le v_f/2) + (b_m)P(v_f/2 \le b_m \le v_f) \right\}P(v_{nf} < v_f \end{aligned} \qquad (8)$$

[15] More compactly and to the point, since the price the seller will receive is always the non-favored highest bid, paid either by the holder of ROFR if she exercised the right and matched the bid or by the non-favored bidder if she declined to match, the expected price paid to the seller (government) is solely determined by the non-favored bidder's bid function.

Note that the expected value to the seller in the standard auction equals the sum of bids of the favored bidder and the non-favored bidder, unlike the case of the auction with ROFR where the expected revenue to the seller depends solely on the bid of non-favored buyer. Thus by logic, the expected value to the seller under the auction with no ROFR is larger than under the auction with ROFR. And it is larger by the amount the favored bidder bids over the non-favored bidder.

Given the results in (7) and (8) we expect the impact of ROFR on auction outcomes such as probability of auction success, entry of bidders, expected seller revenue and profit to be negative. Further, we note that the apparent reduction in the seller expected payoff engendered by the ROFR is most likely captured by the favored bidder if she matches. That is the favored bidder gains at the expense of at least the seller and possibly both the seller and non-favored bidder.

As previously modelled another feature of Taiwan government land auctions is the *reserve price,* which is made public before the commencement of an auction. Lee (2008) discussed above finds that when the seller grants the ROFR and simultaneously imposes a reserve price, the reserve price improves the expected profit or surplus of the seller from the auction and also counterbalances the effects of the ROFR, especially at high degrees of asymmetry between a weak bidder and a strong bidder. It remains to be seen whether empirically the effects of the ROFR and reserve price on the margins of auction outcomes such as the probability of auction success or sale of the asset, number of bidders that enter auctions, bidder behavior within auctions, expected seller revenue and profit are in fact offsetting.

Finally, it is likely that setting the reserve price in the presence of the ROFR would require knowing the circumstances of the bidders, the nature of the asset being auctioned, as well as the market condition for the asset being auctioned. The literature on optimal auction design (e.g. Myerson(1981), Riley and Samuelson (1981)), suggests that the seller should set a sizable reserve price, one that exceeds her own private value for the asset in order to maximize expected revenue. However, in practice there may be reasons why a seller may ostensibly select "suboptimal" reserve prices. For example, while the optimal reserve price in IPV auctions should not depend on the number of bidders, if there are very few bidders the reserve price may very well be the key determinant of the winning bid or sale price at the auction, and hence the seller expected revenue. This may cause the reserve to correlate positively with the number of bidders.

In the context of the auctions analyzed in this paper the "leveling the playing field effect" of the ROFR may cause bidders to behave differently from what standard game theoretic models suggest. Indeed, when the reserve price is too high such that $b_n \geq v_f$, the favored bidder should decline to match (not bid at all). The seller then presents a take-it-or-leave-it" proposition to the non-favored bidder, where she strategically bids the reserve price or minimum bid, b_m, so long as her private value, $v_{nf} > b_m$, and otherwise decline to bid. Thus it is important to understand how reserve prices are set in Taiwan government land auctions particularly when the auction mechanism includes ROFR. As a point of exit we end our empirical analysis by analyzing the determinants of reserve price in Taiwan government auctions with the view to isolating the nature of the effect of ROFR (if any) on the reserve price set by the seller.

4.0 Data Description and Descriptive Statistics

We analyze data from Taiwan on 1012 government auctions conducted between January 2007 and October 2010. The assets for sale are mainly undeveloped lands. The auction mechanism used is first-price sealed-bid auction. A key feature of the auction design which constitutes the major focus of this research is the ROFR found in some of the auctions. Additionally, all the auctions in our sample have reserve price.

The auctions are conducted in three regional locations including Taipei metropolitan area consisting of Taipei city and suburbs, Taichung metropolitan area consisting of Taichung city and suburbs, and Kaohsiung metropolitan area consisting Kaohsiung city and suburbs. Data were tediously collected on an original sample of 2639 auctions from the websites and files of the branch offices of the NPA. After purging the sample for missing data which were concentrated exclusively in Kaohsiung auctions, the final sample size was reduced to 1012 clean auctions from Taipei and Taichung metropolitan areas only.[16]

The data provide details of all real estate assets to be auctioned whether the auction was successful or not and contains information about: (1) property attributes such as land use type, location, size in square meters; and (2) auction design attributes such as the presence of ROFR, reserve price or minimum bid, the date of the auction, etc. Also for each auction in the

[16] Although first-price sealed auctions for the sale of government-owned lands in Taiwan began in 2002, five years worth of data on auctions conducted between 2002 and 2006 were missing from the websites of the branch offices of NPA before this project was conceived. Hence, our study does not cover those missing periods. Additionally, in 2011 the government instructed the NPA to suspend auctions for the sale of state-owned land in prime locations in an effort to curb skyrocketing real estate prices, particularly in Taipei.

sample we collected information about the condition of the market at the time of the auction, measured as the contemporaneous quarter's house price return index. The categorization of auctions by location of the real estate to be auctioned opens up the possibility of investigating the impact of ROFR and reserve price on auction outcomes across distinct real estate markets that may significantly differ in terms of market architecture, intrinsic value of the asset to seller and potential buyers, potential number of entrants, and ultimately demand for the asset to be auctioned.

4.1: Summary Statistics

We begin analysis of the data by providing summary statistics for the total sample shown in Table 2. Panel A shows key statistics for the entire sample consisting of successful and failed auctions. Of the 1012 auctions conducted between 2007 and 2010, 41% were successful or resulted in asset sale. In terms of the variable of interest, about 9% of the auctions had ROFR as a policy tool. Further, the auctions were predominantly for the sale of land for residential real estate development. Over the study period (2007-2010), on average, slightly more than two bidders (2.25) placed bids on a real estate to be auctioned, although there is noticeable variation in the number of bidders as measured by the standard deviation (5.43) which is more than twice the mean number of bidders. The maximum number of bidders over the same period was approximately 23 times the average. Figure 1 provides additional insights on the number bidders. Panel A1 shows that 59% of the auctions had no bidders, i.e. these auctions failed and the assets did not sell. The within auction bidder distribution is shown in Panel A2 of Figure 1. It is clear that most of the auctions (38%) that resulted in asset sale had only one bidder. Other prominent in-auction cluster of bidders manifest around 2, 3-7, 8-12, 13-17 bidders, after which the clustering starts to fade rapidly.

Further examination of Panel A of Table 2 provides some perspective on the heterogeneity of auctioned land based on size, reserve price and the winning bid or sale price. The average reserve price was NT$46.53 or US$1.55M. On average an auctioned property sold for NT$108.5M (US3.62M), or nearly two and half times the mean reserve price, with a standard deviation of NT$350.72M (US$11.69M). Remarkably, Panel A also reveals that a property sold for as high as NT$5.37B or US$179M. Properties to be auctioned are also heterogeneous in terms of size. The mean property size to be auctioned is 555 sq. meters (approximately 6,000 sq. feet.) and the maximum size is 8,812 sq. meters (approximately 95,000 sq. feet). To summarize we make two observations. First, it would seem that properties slated for government auctions are heterogeneous and high valued assets. Second, the variability in the

number of bidders may be due to heterogeneity of auctioned properties, different valuations of the bidders, and the presence of ROFR.

Panel B of Table 2 presents descriptive statistics by presence and absence of the ROFR in the auction. In all cases of the standard margins of auction outcomes such as number of bidders, reserve price and winning bid, the median figures for auctions without ROFR are significantly higher than the corresponding figures for auctions with ROFR. Auctions with ROFR attract on average 1.37 bidders, while for auctions with no ROFR, on average, 2.33 bidders enter. Similarly, as shown by the z scores for the median values of both the reserve price (z=-3.75) and the winning bid (z=-2.04), auctions with no ROFR significantly dominate auctions with the ROFR on these margins of auction outcomes. We also note that auctions with no ROFR are more successful (42%) compared to auctions with ROFR (30%).

In Panel C we focus on descriptive statistics based on the location of the property to be auctioned for the whole sample. On average auctions attract more bidders if the property to be auctioned is located in the city compared to a suburban location (3.11 versus 1.38), on the order of 2.25:1. The seller, on average, sets the reserve prices for properties to be auctioned that are located within the city at a multiple of 3.7 times of those located in the suburbs. Whereas the winning bid for a property located in the city is more than twice the mean reserve price, the winning bid for a property located in the suburb is only about 1.8 times the reserve price. Although, properties to be auctioned located in the suburbs do command less premium, they nevertheless, are on average much bigger in terms of square meters than their city counterparts. These observations make sense given the scarcity of land in urban areas and the fact that land use developments in urban areas (core city) are typically characterized by *intensive margins* as opposed to *extensive margins* in the suburban areas.

Finally, Figures 2, 3, and 4 respectively plot mean reserve price against the number of bidders, seller expected revenue (winning bid) against the mean reserve price, and seller expected profit (winning bid minus reserve price) against the reserve price. We can make several observations from the figures. First, in Figure 2, reserve prices increase with the number of bidders. This descriptive evidence contradicts standard auction theory. Davis et al (2008) suggest that when the number of bidders is small as in this study the optimal reserve price becomes even more critical in maximizing seller revenue. In this situation, most likely it is the reserve price that determines the sale price (or seller expected revenue) at the auctions. As such the number of bidders may correlate with the reserve price. Second, consistent with

auction theory, both seller expected revenue and seller expected profit increase with reserve prices, as revealed in Figures 3 and 4, respectively.

5.0: Estimation Results

In this section, we report estimates from multiple regression models that test predictions of theory on the effects of ROFR on auction outcomes. Specifically, we provide empirical evidence on the impact of the auction policy tool of interest, ROFR, and the reserve price, on five margins of auction outcomes including the probability of auction success, the number of bidders that enter the auctions, bidders' behavior within the auctions, expected seller revenue, and expected seller profit. We also provide empirical evidence on the determinants of reserve prices set by the seller. With regard to the reserve price we are interested in knowing how the seller sets reserve prices because theory predicts that reserve price can help maximize seller revenue, but may also discourage entry, and that reserve prices should be independent of the number of bidders. Moreover, in the context of this study, theory also suggests that the ROFR (our auction tool of primary focus) when combined with the reserve price may act as complements or offset each other's effects on auction outcomes. Thus, we are interested in knowing whether the ROFR influences the level of reserve price set by the seller.

5.1: The Probability of Auction Success or Asset Sale

Ultimately, the success of an auction would depend on bidder entry and bidding behavior. Our empirical model assumes the benefit, B, and cost, C, of entry and bidding are functions of the attributes of the auction design, *X*, in particular the ROFR and reserve price, the attributes of the asset to be auctioned including market condition, *V*. Let

$$B = G(X, V) = \beta_x X + \beta_v + w \qquad (9),$$

and

$$C = J(X, V) = \gamma_x X + \gamma_v + u \qquad (10)$$

where w and u are error terms. The potential bidder enters the auction and bids in the auction when

$$B > C \Rightarrow (\beta_x - \gamma_x)X + (\beta_v - \gamma_v)V + w - u > 0 \Rightarrow \beta Z + \varepsilon > 0 \qquad (11)$$

where Z is the short-hand notation for the summation of the attributes, *X* and *V*. Equation (11) states basically that an auction is likely to be successful (i.e. result in asset sale) if the net benefit *(B-C)* from entry and bidding in the auction is positive.

One approach to the problem of relating the auction outcome probabilities (i.e. successful or failed auction) to the underlying characteristics of the auction design and the asset/market condition is the conditional logistic function (McFadden, 1974, 1976).

$$P_i = P(\beta Z_i + \varepsilon_i > 0) = P(\varepsilon_i > -\beta Z_i = 1/\left[1 + \exp(-\beta Z_i)\right] \qquad (12),$$

where, βZ_i is the i^{th} auction's outcome index, which measures the likelihood that the auction is successful or not successful (i.e. whether the asset is sold or not). While the index cannot be measured directly it is a function of the observable determinants of the auction decision process, i.e. the characteristics of the auction design and asset/market condition. We approximate the index linearly as follows:

$$\hat{\beta Z}_i = \hat{\beta}_0 + \hat{\beta}_1 ROFR_i + \hat{\beta}_2 RP_i + \hat{\beta}_3 RPRD_i + \hat{\beta}_4 LSDUM_i + \hat{\beta}_5 (HRI_i - \overline{HRI}) + \hat{\beta}_6 LOCDUM_i + \varepsilon_i \qquad (13)$$

The variables of (13) are defined in Table 1. A problem arises in estimating equation (13) due to potential endogeneity of the reserve price (*RP*). If the reserve prices set by the seller reflect some quality aspects of the property to be auctioned that are not observable by the researcher neglecting the unobserved attribute(s) in any estimation will bias the coefficients. Although we observe some characteristics of the property to be auctioned chances are that we do not observe all. A potential omitted variable is the intensity of the land use which is difficult to control. To correct for the endogeneity of the reserve prices and obtain consistent estimates of its effects we use the Smith and Blundell (1986) two-step procedure. The first step consists of a linear regression of the reserve price on property attributes and asset size, a variable that is likely to affect reserve price, as instrumental variable. Indeed, an F-test shows a significant partial correlation between reserve prices and the instrumental variable. In the second step the residuals from the first step OLS, labeled *RPRD* in equation (13) above are calculated and included in the second stage regression.

Table 3 reports the estimated logit coefficients for the probability of auction success where some of the auctions have the ROFR. Column 1 in the table shows the results from OLS regression of equation (13), which does not control for endogeneity of the reserve price, and column 2 shows the 2SLS regression results that adjusts for possible endogeneity of the reserve price. Column 3 reports calculated adjusted probabilities or elasticities designed to reveal changes in probability of auction success for interesting values of the significant

variables based on the 2SLS regression. The results show that ROFR has a significant negative effect on the probability of auction success (χ^2=4.16). Holding constant other auction design variables and attributes of the asset to be auctioned and market condition, the presence of ROFR in an auction lowers the probability of auction success by 12%, compared to a standard auction with no ROFR. This result suggests that the presence of ROFR in auctions will lower the probability the asset is sold.

Turning attention to the other important auction policy tool, reserve price, we see that the coefficient on *RP* is positive but insignificant in the OLS regression. However, after correcting for possible endogeneity of the reserve price, the coefficient on the residuals from the first step regression (*RPRD*) is positive and highly significant, suggesting that the reserve price is indeed endogenous. In general, theory suggests that a higher reserve discourages entry of marginal bidders and decrease the probability of sale. Hence, this result is inconsistent with standard auction theory.

We rationalize the result as follows. First, intuition suggests that a higher reserve price may also signal the seller's private information about quality and the true value of the asset to be auctioned. In this regard, a higher reserve price or an unexpected increase in the reserve price may signal a higher valuation of the asset to be auctioned, which may encourage (rather than discourage) bidder entry, especially entry of strong bidders (those with higher valuation). Moreover, bidder behavior is likely to be more strategic when a higher level of reserve price from the seller signals higher valuation for the property to be auctioned, hence the positive effect of reserve price residual on the probability of auction success.

The estimated probability of auction success equation also includes asset characteristics such as land use type, location of the property and a proxy for market condition at the time of the auction. It is clear that an auction is less likely to succeed if the property to be auctioned is located in the suburbs; the probability of auction success is 23% lower if the land to be auctioned is located in the suburb as shown by the calculated adjusted probability. An auction is more likely to result in asset sale if the property to be auctioned is designated for residential development. Likewise, an auction is more likely to succeed if the condition of the market condition is more favorable as measured by the housing return index *(HRI)*. In estimating the auction success equation, we centered the *HRI* variable by subtracting the mean return index for all returns across all auctions, i.e. $(HRI - \overline{HRI})$. The probability of auction success, or the probability that the auction will result in asset sale increases by 9% in hot market.

5.2: Bidder Behavior within Auctions and Seller Expected Value

Prior to this study, the predictions of theory as to whether the ROFR induces bidders to bid more or less aggressively has not been empirically verified using real-world transaction data. Likewise, the ultimate effect of the ROFR on seller expected revenue and profit has not been empirically documented. More generally, there is now an elevated interest in empirically testing whether the behaviors of buyers and sellers in auctions accord with auction theory in general. We contribute to this research by specifically estimating the causal effects of the ROFR, reserve price and other relevant factors on four margins of auction outcomes. These include (1) the number of bidders that enter the auction, (2) in-auction bidding behavior as measured by the bid premium, (3) seller expected revenue conditional on asset sale, (4) and seller expected profit conditional on auction success. For each of the four models of auction outcomes the multiple regression equation to be estimated takes the following form:

$$OUTCOME_{i,j=1,2,3.4} = \lambda_0 + \lambda_1 ROFR + \lambda_2 RP + \lambda_3 RPRD + \lambda_4 LSDUM + \lambda_5 (HRI - \overline{HRI}) + \lambda_6 LOCDUM + \varepsilon_i, \quad (14)$$

where j=1,2,3,4 denotes a specific auction outcome as stated above. With the exception of the auction outcome relating to the number of bidders that enter the auctions, we also include as regressor the centered number of bidders, $(NBDRS - \overline{NBDRS})$, by subtracting the mean number of bidders in all the auctions from the number of bidders variable before estimating the other auction outcomes. Again all the variables are defined in Table 1.

In addition to the endogeneity problem highlighted earlier the estimation of these models of auction outcomes is complicated for another reason. In each of the four models of auction outcomes we observe a continuous non-zero value for the dependent variable, i.e. the number of bidders, bid premium, winning bid or expected seller revenue and expected profit, only for the successful auctions. For the unsuccessful auctions the optimal choice for some potential bidders for the response variable (dependent variable) takes a value of zero with positive probability, whose exclusion in OLS estimation can result in inconsistent and biased estimates of the coefficients, λ_i, in equation (14). Woolridge (2002) labels this problem "*corner solution outcome",* and we follow his recommendation to use the standard censored Tobit model to correct for the inconsistent and biased estimates of the coefficients from an

OLS regression.[17] Adjusting for this problem requires taking into account both successful and unsuccessful auctions.

5.2.1 Bidder Entry into Auctions

Table 4 reports the estimation results for the number of bidders' outcome model. Column 1 presents baseline OLS estimates on the impact of ROFR and reserve price on the number of entrants. In this regression the coefficient on ROFR is negative but insignificant while coefficient on reserve price is positive and significant at the conventional level. Thus, conditional on asset sale, the reserve price increases the number of bidders who enter the auctions, but we have not adjusted for the potential endogeneity of the variable.

Column 2 shows the estimation results for the standard censored Tobit model that corrects for both corner solution outcome and potential endogeneity of the reserve prices. Adjusting for these problems turns out to be important. Both the coefficients on the ROFR and $(HRI - \overline{HRI})$ variables are now significant, and the coefficient on the reserve price is now negative and significant. It is clear from the regression results that granting the ROFR discourages entry of bidders into auctions as reflected by the negative and significant coefficient on the ROFR variable, which is consistent with the theory that the right may discourage the entry of marginal bidders. The negative coefficient on the reserve price suggests that higher reserve price might discourage entry of potential and actual bidders. This result is consistent with standard auction theory that suggests that higher reserve price might weed out marginal bidders.

As a final observation Table 4 shows that with the exception of the coefficient on reserve price, the absolute magnitudes of the Tobit estimates are at least twice as much as the OLS estimates. For example, the Tobit coefficient on ROFR reported in column 2 is roughly six times that of the OLS estimate. However, it is not informative to conclude from this that the Tobit model implies a much greater response of number of bidders to ROFR. To interpret the coefficients correctly we multiply the Tobit estimates by the adjustment factors given in Table 4 to obtain the marginal effects or elasticities for important variables. The adjusted

[17] Note that the issue here is not data observability problem as in censoring or truncation. Rather the dependent variable (.e.g. the auction outcome for some potential bidders) takes a value of zero with positive probability when the auction fails, but is a continuous random variable for other bidders when the auction is successful and the asset is sold.

marginal effects are reported in last column of Table 4. For example conditional on the number of bidders being positive (i.e. successful auctions), an auction design with ROFR (with other variables at their means) decreases expected number of bidders that enter the auction by -18% (.3227x-0.5606 = -0.1809). However, unconditionally or accounting for both potential bidders who did not enter the auction as well as those who did enter and bid, we see that the magnitude of the marginal effects of each independent variable is larger than when we condition only on those who entered the auction and bid. For example, the marginal effect or elasticity of ROFR is now -24% (0.422x-0.5606 = 0.2366), which is comfortably above the OLS estimate.

Turning to the marginal effects of other variables, although the coefficient on reserve price is negative and significant its marginal is clearly small. The location of the property to be auctioned has a dramatic effect on the number of bidders who enter the auction; compared to a city location suburban location of auctioned land, on average, reduces the number of bidders by 39%, unconditionally. In contrast, if the land is designated or zoned for a residential real estate development, the number of bidders who enter the auction increases by about 28%. Taken together, these results suggest that there are important market dynamics and asset differences that affect entry into auctions, quite apart from those emanating from auction design elements such as the ROFR and the reserve price.

5.2.2. Bidders' Behavior within auctions

Table 5 provides evidence on how bidders bid when faced with auction design that includes both ROFR and reserve price. Our measure of bidders' behavior (more or less aggressive bidding) is the ratio of the winning bid (sale price of the asset) to the reserve price. Column 1 in Table 5 shows the results from the OLS regression of equation (14), conditional on observing the winning bid or selling price. This regression does not control for corner solution outcome or endogeneity of the reserve price. The estimation results show that while the ROFR is negative and insignificant the reserve price has a significant and positive impact on the degree of aggressive bidding, although the coefficient is small.

The second column of Table 5 shows the results of the standard censored Tobit regression that also adjust for endogeniety of the reserve price of bidding behavior in the presence of the ROFR and the reserve price based on the entire sample (successful and unsuccessful auctions). The coefficient on the ROFR is now very significant (t-value =-2.31) and the reserve price residual is significant as well. Indeed, accounting for the auctions with no

bidders (unsuccessful auctions) as well as successful auctions is important in that the coefficient on the land use dummy *(LSDUM)* and the centered house return index $(HPRI - \overline{HPRI})$ are now both significant.

To shed more light on the results, we note that the presence of the ROFR, the variable of interest, decreases aggressive bidding by about 9% (-.2710x.3354 =0.0909), conditional on asset sale; unconditionally the corresponding figure is about 12%. Similarly, accounting for auction success (asset sale) and auction failure (no asset sale), the marginal effect of reserve price though is 6.2%. Finally, column 3 of Table 5 repeats the regression model (14) with one additional variable, the centered number of bidders $\left(NBRS - \overline{NBRS}\right)$ calculated as the number of bidders minus the average number of bidders faced by the seller in all successful auctions. This innovation has a dramatic effect on both the impact of the ROFR and reserve prices, as both variables cease to be significant. Interestingly, the coefficient on the centered number of bidders is positive and highly significant, suggesting bidders bid more aggressively as the number of bidders increase; the increase in aggressive bidding is about 3.5% (0.4748x0.0733=0.0348), for each additional bidder. This result is consistent with the observation of Bulow and Klemperer (1996) that adding one more bidder is preferable over setting an optimal reserve price, since aggressive bidding is more likely to increase seller revenue.

5.2.3 Expected Seller Revenue and Expected Seller Profit from Auctions

In this section, we examine the causal effects of auction policy tool of interest, right-of-first-refusal, and the reserve price on seller expected payoff. We undertake this exercise by estimating equation (14) for the winning bid, our proxy for seller expected revenue, and the winning bid minus reserve price, our proxy for seller expected profit, as dependent variables.

Table 6 provides empirical evidence of the effects of ROFR and reserve price on seller expected revenue, while controlling for other contributing factors, and Table 7 provides complementary evidence on the effects of the two auction policy tools on seller expected profit. As before, we have taken time to correct for the two complicating problems that plaque our estimation of the regression equations. From the two tables we can make a number of observations: First, the ROFR clearly reduces seller expected revenue and profit. Based on the results of standard censored Tobit regression shown in the last but one column, the ROFR reduces expected revenue and expected profit. Holding constant other variables the presence of ROFR reduces the winning price or expected seller revenue by NT$0.40 and

seller expected profit by NT$0.07, when we account for both successful and failed auctions. This empirical evidence provides support for the cluster of theory of ROFR that predicts the right will reduce expected seller payoff. Thus the *right-of-first-refusal* may be inimical to seller welfare, unless there is some upfront compensation from the right holder to the seller.

Second, consistent with standard auction theory the reserve price increases both seller expected revenue and seller expected profit, conditional on asset sale and unconditionally. The effect of first-stage residuals of the reserve price on expected seller revenue or the winning bid is NT$0.185 (0.463x0.4004) for every NT$1.0 increase in reverse price. As in our earlier results of auction outcomes these results suggest that the reserve price partially counterbalances the negative effect of the ROFR on seller expected revenue

Next, we examine the effects of other independent variables on expected seller revenue and profit. Both seller revenue and seller profit increase with the number of bidders consistent with auction theory. The coefficient on the centered number of bidders is positive and highly significant in both the seller expected revenue and expected profit regressions. As shown by the calculated marginal effects in Tables 6 and 7 (last column), each additional bidder increases seller expected revenue by 14 cents and seller expected profit by 8 cents, unconditionally. The location of the auctioned property has a huge effect on seller expected revenue. For example, seller expected revenue decreases by 64 cents if the auctioned property is located in the suburb compared to a city location, holding other variables constant. Although the coefficient on the centered housing return index is positive and significant, the marginal effect of each additional return is rather small when compared and contrasted with the impact of other variables.

5.3 Determinants of seller Reserve Price

The objective of this final empirical analysis is to understand and provide empirical evidence on how the seller sets reserve prices in auctions wherein some of the auctions offers the auctioneer some control in determining the winner, i.e. price formation and allocation are decoupled. The motivation for this exercise comes from two sources. First, the empirical literature has documented that in practice some bidder behaviors are not in accordance with prescriptions of auction theory. Second, to this point our own analyses show that with the exception of one auction outcome, the reserve price positively impacts every other margin of auction outcome we investigate, in sharp contrast to the negative effects of the ROFR on the same auction outcomes. Third, intuitively, the presence of the ROFR complicates the real-

world auction environment we analyze; thus it would be interesting to find out whether this auction policy tool influences how reserve prices are set by the seller.

Myerson (1981) and Riley and Samuelson (1981) both stress that a revenue maximizing seller should set a reserve price above her own value, v_0, for the object, $r^* = v_0 + \frac{(1 - F(r^*))}{f(r^*)}$ where r^* is the optimal reserve price, and F is the distribution function with density given by $F' = f$, from which bidders draw their private values for the object to be auctioned. Note that in this setting the optimal reserve price does not depend on the number of bidders at the auction. We investigate how the seller sets the reserve price by estimating the following regression model.

$$LOGRP_{i,} = \lambda_0 + \lambda_1 ROFR + \lambda_2 (NBDRS - \overline{NBDRS}) + \lambda_3 LDA + \lambda_4 LSDUM$$
$$+ \lambda_5 (HRI - \overline{HPRI}) + \lambda_5 LOCDUM + \lambda_6 YRDUMS + \varepsilon_i, \quad (15)$$

In the above model we have included both the centered house return index ($HPRI - \overline{HPRI}$) and the year fixed effects *(YRDUMS)* to account for changing market conditions and learning in setting the reserve price.

Table 8 reports the regression results on the determinants of the reserve price. From the Table we can make the following observations. First, reserve prices are clearly not independent of the ROFR; all else equal the ROFR decreases the reserve price by NT$23.0, per NT$100 of reserve price. Second, contrary to theory the reserve price is not independent of the number of bidders either. The coefficient on the centered number of bidders, $(NBDRS - \overline{NBDRS})$, is positive and significant, suggesting that for each additional bidder the seller increases the reserve price by NT$4.63, per NT$100 of the reserve price.

Although the behavior of the seller in setting the reserve price is inconsistent with the theory as it relates to the impact of the number of bidders it may be a rational response to the distribution of bidders across auctions. For example, our data show that more than one third of the successful auctions, i.e. auctions that result in sale, had only one bidder. In this situation the number of bidders will likely influence the reserve price and ultimately seller expected revenue and profit. Next, the effects of asset characteristics on the reserve are obvious as revealed by the significant coefficients on land area *(LNDA)* and the location dummy *(LOCDUM)*, although they have opposite effects. For each additional square meter increase in asset size, the seller increases the reserve price by NT$66.0, per NT$100 unit of

reserve price; and relative to a city location, the reserve price declines by NT$107 (per NT$100 unit of reserve price) if the land to be auctioned is located in the suburbs.

To account for the possibility of learning and responding to changing market conditions in setting the reserve price, we included two measures of market condition: a broad measure using year dummies as proxy and a narrow measure based on the house return index centered on its mean, as independent variables. Table 8 shows that over time the seller increases reserve prices rather considerably; for example relative to the base year (2007) the seller increases reserve prices by NT$33.83, NT$51.38 and NT$27.71 in 2008, 2009 and 2010, respectively, per NT$100 of reserve price. In contrast, the coefficient on the centered house return index, $(HRI - \overline{HRI})$, is negative and significant (t-value = -4.0) suggesting that the seller decreases reserve prices slightly by -NT$4.19 as market returns rise above their mean, per NT$100, which seems counter intuitive.

6.0 Discussion

This section revisits our findings in light of some major economic transactions where the ROFR was utilized as mechanism for allocation. Thus far our empirical results strongly suggest that the presence of ROFR in auctions reduces the likelihood of asset sale, discourages bidder entry into auctions and ultimately reduces seller expected revenue and profit. At a policy level, our analysis and results have broad relevance on real-world economic transactions that use ROFR to complete transactions and could be used to shed light and better understand the practical effects of this hybrid mechanism on bidders' behavior, entry and ultimately the auctioneers expected payoff.

To illustrate, consider first the solicitation for bids for the sale of Miami Dolphins Sports franchise in 1994. At that time Wayne Huizenga, the founder of Blockbuster video, owned a 15% stake in the sports franchise and also strategically had a ROFR on the sale of the franchise. Rather inauspiciously, the sale attracted only one other buyer whose bid was considered to be considerably below the valuation of the football franchise and the holder of the ROFR matched the only bid (see Bikchandani et al 2005).[18] Our empirical evidence anticipates and is consistent with the outcome of this economic transaction in showing that

[18] Although the purchase price was not officially disclosed, according to the New York Times (January 25, 1994), Huizenga paid about $140 million to acquire the remaining 85% interest.

the ROFR discourages entry into auctions, creates incentive for bidders to bid less aggressively; thereby reducing seller expected revenue and profit.[19]

Next, consider also the case of the U.S. National Park Service concession contracts.[20] The GAO in several reports suggested *inter alia* that the ROFR is to blame for the fewer number of bidders, non-competitive bids and ultimately the meager rate of return for the government on the presence of ROFR in concession contracts that are up for renewal.[21] Although there was little empirical evidence to back this claim the issue became so contentious that in May 2000, the NPS eliminated the ROFR in concession contracts with gross revenue of $500,000 and above. In retrospect this study provides empirical support for the action taken by the NPS, in showing that the presence of ROFR indeed be anti-competitive in decreasing the number of bidders that enter the auctions and ultimately decreases seller expected surplus or profit.

The evolution of the 2003 Airbus Industries invitation for bids to supply jet engines for its military transportation aircraft, A400M, was in effect a bid solicitation with *implicit* ROFR granted to the domestic bidder, if not in name. EuroProp, the "domestic favored" bidder was allowed to revise its original bid, but Pratt & Whitney, the most competitive bidder, was not granted similar opportunity. EuroProp won the procurement auction contract to supply the jet engines worth over €4.0 billion (US$5.6 billion) simply by matching the bid of the non-favored bidder, Pratt & Whitney. Our empirical evidence has relevance on the political economy of this politically sensitive and high stake economic transaction. Based on our empirical results, we conjecture that in this particular instance the ROFR may have played a role akin to a reserve price in helping to establish the most competitive bid price to match above which Airbus will not procure the engines from Euro Prop.[22].

Finally, although, we do not provide empirical evidence a standard prediction of the theory (and ours as well) is that a rational holder of the ROFR will match only if her valuation is

[19] Presumably the right holder may have won the contest with a lower valuation, which is inefficient.

[20] NPS concession contract is big business; for example in 1994 the gross revenue of concessioners on federal lands was about $2.2 billion, but only about 3% was paid to government in fees

[21] See for example GAO (1996), Testimony before the Subcommittee on National Parks and Public Lands, Committee on Resources, House of Representatives

[22] A somewhat similar situation was the sale of bankrupt South Korean brewery company, Jinro, where the domestic bidder, Oriental Brewery, after submitting its bid learned the terms of the bid submitted by the more competitive bidder, Coors. Subsequently, Oriental Brewery apparently favored by the seller was allowed to revise its bid, presumably matching that of Coors and was accepted as the winning bid.

above the winning bid submitted by a non-favored bidder [See for example Bkhchandani et al (2002), Choi (2009), Chouinard (2005) and Lee (2008)]. A real-world transaction in point was Carnival Corporation case, a cruise shipping firm that solicited bids to build the Queen Mary II ocean liner in 2000. In this case the revised bid submitted by the favored bidder, Harland & Wolf, a struggling but tradition-rich British ship yard, who in fact built the original Queen Mary, could not match the terms of the bid proposed by the non-favored rival. The non-favored rival, Chatiers de L'Atlantique, ultimately won the contract.[23]

Summary and Conclusions

This paper contributes to the auction literature by providing the first empirical evidence of the effects of ROFR on several margins of auction outcomes, based on 1012 auctions for the sale of Taiwan government-owned lands. In order to discriminate among the competing predictions of theory regarding the impact of ROFR, we estimate several multiple regressions of auction outcomes. We find that the presence of the ROFR in auctions: (i) decreases the probability of auction success or asset sale, (ii) discourages bidder entry into auctions, (iii) induces bidders to bid less aggressively within auctions, and (iv) decreases both seller expected revenue and expected profit, conditional on the asset being sold, as well as unconditionally.

Interestingly, with the exception of entry into auctions, the reserve price, another important auction policy tool uniformly present in all the auctions we analyzed, partially offsets the negative effects of ROFR on standard auction outcomes. Also remarkably, on the determinants of the reserve price set by the seller, the ROFR is shown to have a negative impact on the level of reserve prices. On the substantive question of the nature of the impact of the ROFR on auction outcomes, the logical conclusion from the synthesis of our empirical evidence is that we can discriminate in favor of the branch of theory that predicts that the ROFR will have negative effects on auction outcomes, especially seller expected payoff.

At a policy level, the collective results of our analysis would seem to question the wisdom of granting the ROFR, since all the margins of auction outcome we analyze suggest that the

[23] The right of first refusal is also used in entertainment and sports contracts. In 2001 Paramount Studios, the producer of the successful TV show *Frasier*, renegotiated its expired contract with NBC, where NBC, as the incumbent network at the time held the ROFR. NBS was given 10 days to match the terms offered by CBS (Grosskopf and Roth 2009).

seller would most likely not be able to maximize her expected value in this particular case. This raises the existential question of why the ROFR is often found in economic transactions involving vast sums of money. In the auctions we analyzed the ROFR is granted by statute perhaps to accomplish other goals besides maximizing seller expected revenue. Further, as noted earlier in all cases where the statutory ROFR is invoked in the sale of real estate in Taiwan, the common thread and hence the *raison d'être* for granting the right appears to stem from the fact that the potential recipient of the right already has some property right in the property being sold.

Further, in the context of Taiwan land tenure and real estate transactions granting the ROFR may have an economic motive in that it may serve to consolidate fragmented property rights in fewer hands which may give rise to economies of scale resulting in more efficient land utilization. Indeed, Taiwan is known for its fractional ownership of property rights and previous land tenure reforms have attempted to consolidate property rights. Heller (1998) suggests that too many property rights (anticommons) in the same contiguous land might hamper economic efficiency. If this perspective is correct then a pure standard auction is not flexible enough to promote the goal of consolidating property rights in fewer hands to achieve economies of scale in land utilization. Nevertheless, if bidders are symmetric granting the ROFR to one of the bidders by legislative fiat would seem to impose a constraint on economic transaction which reduces seller expected revenue and profit, although it may accomplish other objective.

Finally, our results may suggest a future research direction. A ubiquitous result of our analysis is that the reserve price tends to counterbalance the negative effect of ROFR. Hence, a potential direction of future research on auction design could concentrate on developing a hybrid mechanism that preserves the "benefit" of ROFR, e.g. promoting economies of scale in land development, but mitigate its detrimental effects on the seller. Indeed, based on our results the policy of granting ROFR by the seller may be locally optimal if it is combined with the reserve price, given the counterbalancing effect of the latter policy tool. This is in the sense that the reserve price may tilt the mix of auction entrants towards more experienced, knowledgeable bidders (with high valuation for the asset being auctioned), which may mitigate the reduction in expected seller revenue or profit induced by the presence of the ROFR.

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Table 1: Definition of Variables

Variable	Definition
ROFR	Equals 1 if someone has a right-of-first-refusal on the land to be auctioned and 0 otherwise.
RP	Reserve price , or the minimum bid set by the seller in millions of New Taiwan dollars(NT$MM)
RPSD	Residuals of reserve price from first stage least squares regression
NBDRS	Number of bidders in an auction.
NBDRS- $\overline{NBDRS}$	Number of bidders minus the average number of bidders over all auctions
LSDUM	Equal 1 if the land use for the property to be auctioned is residential and 0 otherwise.
LDA	Natural logarithm of land area in square meters
LOCDUM	Equals 1 if the land to be auctioned is located in suburb and 0 otherwise
HRI	House price return index
HRI - $\overline{HPRI}$	House price return index minus the average house return index
Seller Expected Revenue	Winning bid (highest price) at each auction (NT$MM).
Seller Expected Profit	Winning bid minus the reserve price (NT$MM)
Bid Premium	Winning bid divided by the reserve price (proxy for bidders' behavior in bidding, i.e. aggressive or less aggressive bidding).

Table 2: Summary statistics of land auctions

The sample consists of 1012 auctions for the sale of government-owned land in Taiwan from 2007 to 2010. The auction was conducted in Taipei metropolitan area and Taichung metropolitan area. This table shows summary statistics of key variables in the sample. *Number of bidders (NBDRS)* is the number of bidders that enter the auctions. *Reserve price* (*RP)* (NT$1MM) is the minimum bid or floor price at each auction, below which the government will not sell the land. The exchange rate at the end of 2010 was US$1 =NT$30. *Winning bid* is the highest price bid at each auction. *Bid premium* is the winning price divided by the reserve price. *Land Area* is measured in square meters. *%successful auctions* is the number of successful auctions divided by the total number of auctions. *% auctions with ROFR* is the number of auctions with the right-of-first refusal divided by the total number of auctions. *% residential* is the number of lands designated for residential development divided by the number of all lands to be auctioned

Panel A: Summary statistics of whole sample (successful and failed auctions)

Variables	Mean	Median	Std.dev.	Min	Max
NBDRS	2.25	0	5.31	0	52
RP (in NT$1MM)	46.53	14.95	155.22	0.000255	2,291.85
Winning bid (in NT$1MM)	108.51	19.28	350.72	0.156	5,367.89
Bid premium	1.38	1.15	1.57	1	32.09
Land Area (m^2)	555.05	212.7	902.96	1	8,812
HRI, House price index return (%)	2.97	3.87	3.68	-5.84	8.64
Successful auctions (%)	40.81				
Auctions with ROFR (%)	8.6				
Residential usage (%)	83.79				
Total sample size (N)	1,012				

Panel B: Comparative statistics for total auction sample by presence and absence of ROFR

Sample	Without ROFR					With ROFR					Difference			
Variables	Mean	Median	Std.dev.	Min	Max	Mean	Median	Std.dev.	Min	Max	Mean	T	Median	Z
NBDRS (# of bidders)	2.33	0	5.43	0	52	1.37	0	3.68	0	22	0.97	(2.23)**	0.00	(-2.26)**
RP (Reserve price in NT$1MM)	46.54	15.78	150.52	0.000255	2291.85	46.45	9.75	199.56	0.18	1727.67	0.09	(0.00)	6.03	(-3.75)***
Winning bid (in NT$1MM)	108.73	20.78	353.36	0.156	5367.89	105.21	10.38	314.95	1.13	1467.8	3.52	(0.05)	10.40	(-2.04)**
Bid premium	1.39	1.15	1.62	1.00	32.09	1.27	1.10	0.41	1.00	2.69	0.12	(1.09)	0.05	(-1.75)*
Land Area (m^2)	556.40	210	919.03	1	8812	540.73	220.45	714.15	1	4232.88	15.66	(0.19)	-10.45	(0.71)
HRI, House price index return (%)	2.96	3.87	3.71	-5.84	8.64	3.08	3.94	3.43	-5.84	8.64	-0.12	(-0.29)	-0.07	(0.31)
Successful auctions (%)	41.84					29.89					11.95	(2.30)**		
Residential usage (%)	82.38					98.85					-16.47	(-9.69)***		
Sample size (N)	925					87								

Panel C: Comparative statistics for the whole auction sample by location of property to be auctioned

Sample	Core area					Suburb					Difference			
Variables	Mean	Median	Std.dev.	Min	Max	Mean	Median	Std.dev.	Min	Max	Mean	t	Median	Z
NBDRS (# of bidders)	3.11	1	6.08	0	36	1.38	0	4.21	0	52	1.73	(5.27)***	1.00	(-7.29)***
RP (Reserve price n NT$1MM)	72.85	20.18	212.59	0.18	2291.85	19.68	9.51	34.49	0.000255	495.25	53.1	(5.58)***	10.67	(-8.27)***
Winning bid (in NT$1MM)	150.31	29.01	429.77	0.38	5367.89	35.98	10.88	90.13	0.16	760.08	114.33	(4.15)***	18.13	(-5.26)***
Bid premium	1.48	1.19	1.95	1.00	32.09	1.22	1.08	0.33	1.00	2.83	0.27	(2.15)**	0.11	(-4.37)***
Land Area (m^2)	305.23	130	614.70	1	7060	809.85	448	1065.06	1	8812	-504.62	(-9.21)***	-318.00	(10.11)***
HRI, House price index return (%)	2.81	3.87	4.30	-5.84	8.64	3.14	2.93	2.92	-4.38	7.15	-0.33	(-1.40)	0.94	(0.21)
Successful auctions (%)	51.27					30.14					21.13	(7.00)***		
Auctions with ROFR (%)	5.68					11.58					-5.90	(-3.35)***		
Residential usage (%)	79.84					87.82					-7.98	(-3.47)***		
Sample size (N)	511					501								

Table 3: Logistics regression results of probability of auction success

The dependent variable is a dummy variable, equals 1 if the auction was successful and 0 otherwise. *ROFR* dummy equals 1 if someone has the right of first refusal on the land and 0 otherwise. *RP* is reserve price or minimum bid set by seller measured in NT$1MM. *RPRD* is reserve price residual from first stage OLS regression. *LSDUM* dummy equals 1 if land use is residential and 0 otherwise. *(HRI- HRI)* is the current quarter's house return index minus the average house return index. *LOCDUM* is location dummy which equal 1 if the land to be auctioned is located in the suburb and 0 otherwise. We control the fixed effects by including the year dummies. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	Logistic regression		Accounting for endogeneity		Marginal effect	
	Estimates	χ2	Estimates	χ2	Adjusted probability	
ROFR	**-0.4747**	**(3.50)***	**-0.5268**	**(4.16)****	**-0.12033**	
RP	0.0008	(2.54)	-0.0009	(2.70)	-0.03583	-0.03488
RPRD			0.2889	(22.06)***	0.09830	0.10626
LSDUM	0.3690	(3.85)**	0.4937	(6.31)**	0.11441	
HRI	0.0990	(21.06)***	0.1017	(21.56)***	0.08647	0.09257
LOCDUM	-0.9246	(39.16)***	-0.9656	(41.47)***	-0.22905	
Intercept	-0.6357	(10.38)***	-0.7809	(14.42)***		
Year dummy	yes		yes			
-2 Log likelihood	1280.906		1257.535			
Pseudo R^2	0.0830		0.1039			
N	1,012		1,012			

Table 4: Bidders Entry into auction regression results

The dependent variable is the natural logarithm of the number of bidders in an auction. *ROFR* dummy equals 1 if someone has the right of first refusal on the land and 0 otherwise. *RP* is reserve price or minimum bid set by seller measured in NT$1MM. *RPRD* is reserve price residual from first stage OLS regression. *LSDUM* dummy equals 1 if land use is residential and 0 otherwise. *HRI* is the current quarter's house return. *LOCDUM* is location dummy which equal 1 if the land to be auctioned is located in the suburb and 0 otherwise. We control the fixed effects by including the year dummies. Model 1 is OLS. Model 2 is standard censored Tobit regression corrected for possible endogeneity of the reserve price. Adjustment factor1 and adjustment factor2 used to adjust Tobit MLE coefficients conditional and unconditional on asset sale or auction success, respectively. R^2 for Tobit model is computed by correlating the dependent variable with the predicted value and squaring the result. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	Model 1 (OLS)		Model 2 (Tobit with correction of endogeneity)		Adjusted marginal effect	
	Estimates	t-value	Estimates	t-value	Uncensored	Censored and uncensored
ROFR	**-0.0884**	**(-1.08)**	**-0.5606**	**(-2.39)****	**-0.1809**	**-0.2366**
RP	0.0010	(2.98)*	-0.0010	(-2.00)**	-0.0003	-0.0004
RPRD			0.3316	(6.49)***	0.1070	0.1399
LSDUM	0.2056	(2.56)*	0.5653	(3.29)***	0.1824	0.2386
HRI	0.0091	(0.72)	0.0880	(4.47)***	0.0284	0.0371
LOCDUM	-0.1343	(-5.66)**	-0.9277	(-6.93)***	-0.2994	-0.3915
Intercept	1.5121	(17.56)***	-0.9685	(-3.47)***	-0.3125	-0.4087
Year dummy	yes		yes			
Adjustment factor 1			0.3227			
Adjustment factor 2			0.4220			
R^2	0.0731		0.1044			
Number of observations	413		1,012			
Number of censored obs.			599			

Table 5: Within Auction Bidder's Behavior

The dependent variable is the log winning price divided reserve price (bid premium). *ROFR* dummy equals 1 if someone has the right of first refusal on the land and 0 otherwise. *RP* is reserve price or minimum bid set by seller measured in NT$1MM. *RPRD* is reserve price residual from first stage OLS regression. *(NBDRS- $\overline{NBDRS}$)* is the number of bidders minus the average number of bidders across auctions. *LSDUM* dummy equals 1 if land use is residential and 0 otherwise. *HRI* is the current quarter's house return. *LOCDUM* is location dummy which equal 1 if the land to be auctioned is located in the suburb and 0 otherwise. We control the fixed effects by including the year dummies. Model 1 is OLS. Model 2 is standard censored Tobit regression corrected for possible endogeneity of reserve price. Model 3 is standard censored Tobit regression, corrected for with the endogeneity of reserve price, and with centered number of bidders as additional regressor. Adjustment factor1 and adjustment factor2 are as described previous tables. R^2 for censored model is computed by correlating the dependent variable with the predicted value and squaring the result. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	Model 1 (OLS)		Model 2 (Tobit with correction of endogeneity)		Model 3 (Tobit with correction of endogeneity and NBDRS)		Adjusted marginal effect	
	Estimates	t-value	Estimates	t-value	Estimates	t-value	Uncensored	Uncensored and Censored
ROFR	**-0.0300**	**(-1.12)**	**-0.2710**	**(-2.31)****	**-0.1504**	**(-1.59)**	**-0.0526**	**-0.0714**
RP	0.0003	(4.04)**	-0.0004	(-1.59)	-0.0002	(-0.72)	-0.0001	-0.0001
RPRD			0.1375	(5.35)***	0.0326	(1.51)	0.0114	0.0155
NBDRS- $\overline{NBDRS}$					0.0733	(16.03)***	0.0256	0.0348
LSDUM	0.0290	(2.3)	0.2338	(2.72)***	0.0710	(1.02)	0.0248	0.0337
HRI	-0.0021	(-0.89)	0.0422	(4.28)***	0.0255	(3.19)***	0.0089	0.0121
LOCDUM	-0.0601	(-4.8)**	-0.4713	(-7.00)***	-0.2963	(-5.42)***	-0.1037	-0.1407
Intercept	0.8638	(47.92)***	-0.4190	(-2.99)***	-0.2633	(-2.30)**	-0.0921	-0.1250
Year dummy	yes		yes		yes			
Adjustment factor 1			0.3355		0.3499			
Adjustment factor 2			0.4474		0.4748			
R^2	0.1032		0.0930		0.3082			
Number of observations	413		1,012		1012			
Number of censored obs.			599		599			

Table 6: Expected seller revenue

The dependent variable is the log of winning price. *ROFR* dummy equals 1 if someone has the right of first refusal on the land and 0 otherwise. *RP* is reserve price or minimum bid set by seller measured in NT$1MM. *RPRD* is reserve price residual from first stage OLS regression. *(NBDRS-* $\overline{NBDRS}$) is the current quarter's house return index minus the average house return index. *LSDUM* dummy equals 1 if land use is residential and 0 otherwise. *HRI* is the current quarter's house return. *LOCDUM* is location dummy which equal 1 if the land to be auctioned is located in the suburb and 0 otherwise. We control for fixed effects by including the year dummies. Model 1 is OLS. Model 2 is standard censored Tobit regression corrected for potential endogeneity of reservation price. Model 3 is standard censored Tobit regression, corrected for possible endogeneity of reserve price, and with centered number of bidders as additional regressor. Adjustment factor1 and adjustment factor2 for reporting the marginal effects of independent variables conditional and unconditional on auction outcome, respectively. R^2 for censored model is computed by correlating the dependent variable with the predicted value and squaring the result. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	Model 1 (OLS)		Model 2 (Tobit with correction of endogeneity)		Model 3 (Tobit with correction of endogeneity and NBDRS)		Adjusted marginal effect	
	Estimates	t-value	Estimates	t-value	Estimates	t-value	Uncensored	Uncensored and Censored
ROFR	**-0.4906**	**(-1.66)**	**-1.3223**	**(-2.83)*** **	**-0.8596**	**(-2.22)** **	**-0.2954**	**-0.3980**
RP	0.0062	(5.19)**	-0.0008	(-0.84)	0.0002	(0.24)	0.0001	0.0001
RPRD			0.7935	(8.01)***	0.4004	(4.76)***	0.1376	0.1854
NBDRS- $\overline{NBDRS}$					0.2835	(15.62)***	0.0974	0.1313
LSDUM	0.1542	(0.74)	1.0633	(3.14)***	0.4296	(1.53)	0.1476	0.1989
HRI	0.002	(0.11)	0.1817	(4.68)***	0.1179	(3.66)***	0.0405	0.0546
LOCDUM	-0.5467	(-3.31)**	-2.0590	(-7.77)***	-1.3992	(-6.37)***	-0.4808	-0.6478
Intercept	3.2608	(10.9)***	-1.7933	(-3.25)***	-1.2290	(-2.66)***	-0.4223	-0.5690
Year dummy	yes		yes		yes			
Adjustment factor 1			0.3323		0.3436			
Adjustment factor 2			0.4410		0.4630			
R^2	0.4679		0.2236		0.3855			
Number of observations	413		1012		1012			
Number of censored obs.			599		599			

Table 7: Expected seller profit regression

The dependent variable is the log of dollar premium measured as the difference of winning price and the reservation price. *ROFR* dummy equals 1 if someone has the right of first refusal on the land and 0 otherwise. *RP* is reserve price or minimum bid set by seller measured in NT$1MM. *RPRD* is reserve price residual from first stage OLS regression. *(NBDRS- $\overline{NBDRS}$)* is the current quarter's house return index minus the average house return index. *LSDUM* dummy equals 1 if land use is residential and 0 otherwise. *HRI* is the current quarter's house return. *LOCDUM* is location dummy which equal 1 if the land to be auctioned is located in the suburb and 0 otherwise. We control the fixed effects by including the year dummies. Model 1 is OLS. Model 2 is standard censored Tobit regression and is corrected with the endogeneity of reservation price. Model 3 is standard censored Tobit regression, corrected with the endogeneity of reservation price, and with centered number of bidders as additional regressor. Adjustment factor1 and adjustment factor2 are recommended by Wooldridge (2002) for reporting the marginal effects on the expected value for *y* for uncensored observations and marginal effect on the expected value for y (censored and uncensored). R^2 for censored model is computed by correlating the dependent variable with the predicted value and squaring the result. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	Model 1 (OLS)		Model 2 (Tobit with correction of endogeneity)		Model 3 (Tobit with correction of endogeneity and NBDRS)		Adjusted marginal effect	
	Estimates	t-value	Estimates	t-value	Estimates	t-value	Uncensored	Uncensored and Censored
ROFR	**-0.3338**	**(-1.49)**	**-1.1078**	**(-2.67)*** **	**-0.5890**	**(-1.98)** **	**-0.1513**	**-0.1667**
RP	0.0065	(4.6)**	-0.0005	(-0.65)	0.0005	(0.88)	0.0001	0.0001
RPRD			0.7475	(8.58)***	0.3326	(5.19)***	0.0854	0.0942
NBDRS- $\overline{NBDRS}$					0.2837	(20.50)***	0.0729	0.0803
LSDUM	0.1978	(4.06)**	0.9809	(3.27)***	0.3023	(1.41)	0.0776	0.0856
HRI	-0.0165	(-2.1)	0.1501	(4.38)***	0.0781	(3.16)***	0.0201	0.0221
LOCDUM	-0.6741	(-8.37)***	-1.8972	(-8.09)***	-1.1567	(-6.85)***	-0.2970	-0.3275
Intercept	1.8508	(12.08)***	-2.5731	(-5.28)***	-1.7869	(-5.04)***	-0.4589	-0.5059
Year dummy	yes		yes		yes			
Adjustment factor 1			0.2616		0.2568			
Adjustment factor 2			0.2937		0.2831			
R^2	0.4148		0.2423		0.5297			
Number of observations	413		1012		1012			
Number of censored obs.			599		599			

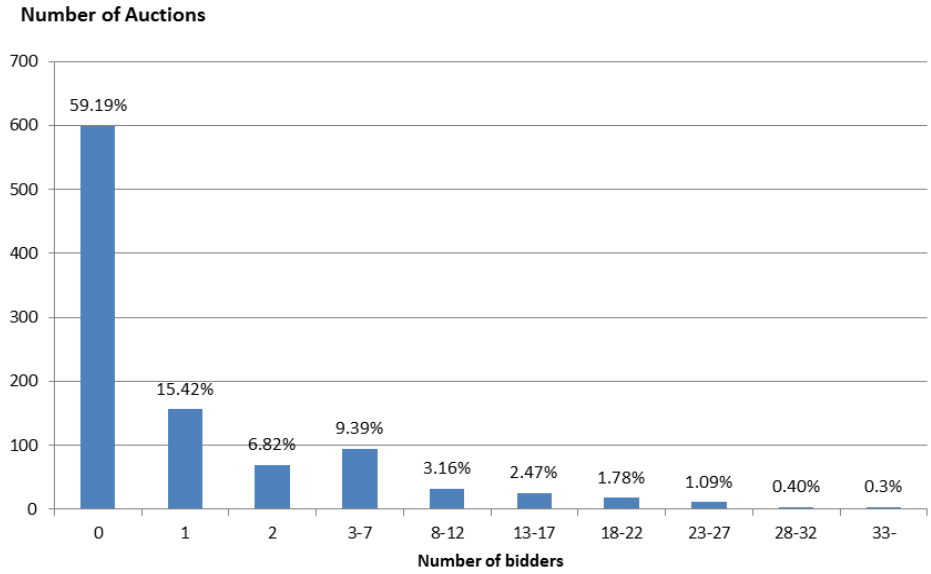
Table 8: Regression results for reservation prices

The dependent variable is the natural log of the reservation price (NT$1MM). *ROFR* dummy equals 1 if someone has the right of first refusal on the land and 0 otherwise. *LDA* is the natural logarithm of land area. *LSDUM* dummy equals 1 if land use is residential and 0 otherwise. ($HRI - \overline{HRI}$) is the current quarter's house return-the average of quarterly house return. *LOCDUM* is location dummy which equal 1 if the land to be auctioned is located in the suburb and 0 otherwise. We year dummies to control for fixed effects. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Variable	Estimates	t-value
ROFR	-0.2620	(-2.87)***
LDA	0.6146	(27.75)***
LSDUM	-0.0062	(-0.06)
$HRI - \overline{HRI}$	-0.0353	(-3.61)***
LOCDUM	-1.1571	(-17.91)***
Year=2007		
Year=2008	0.3827	(5.21)***
Year=2009	0.5500	(5.99)***
Year=2010	0.3355	(3.54)***
Intercept	4.0272	(30.29)***
R^2	0.5641	
N	1012	

Figure 1: Frequency of number of bidders

Panel A: Whole sample (successful and unsuccessful auctions)



Panel B: Successful auction sample

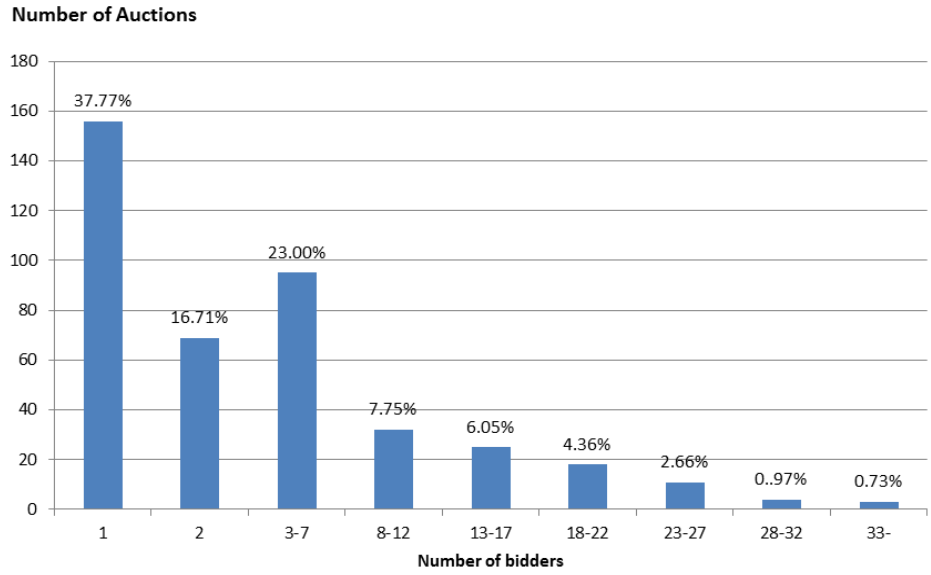


Figure 2: reserved price vs. number of bidders

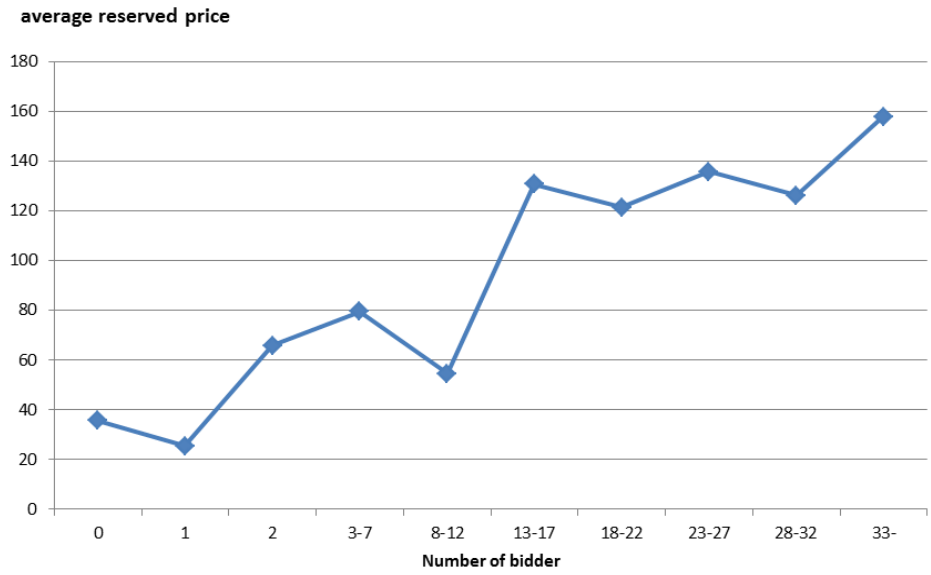
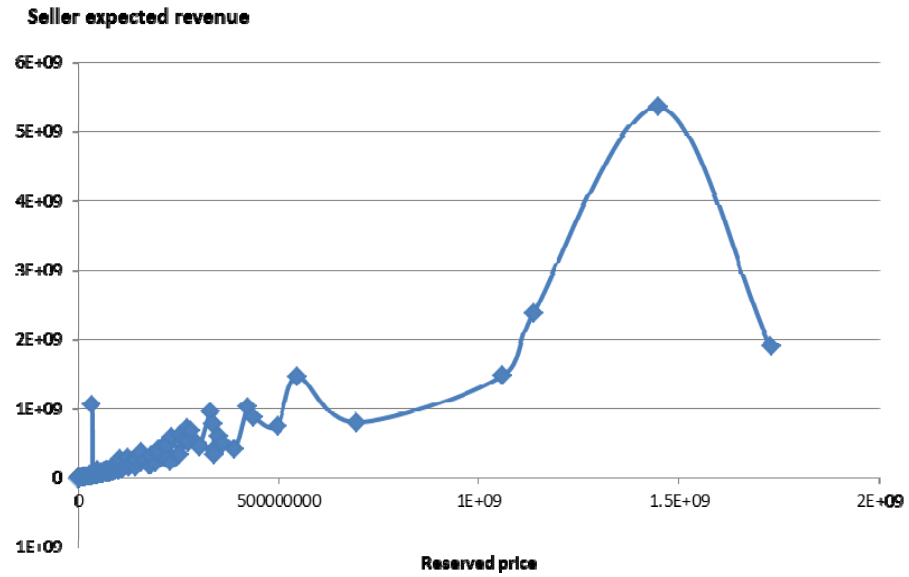


Figure 3: Seller expected revenue vs reserved price



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An Economic Analysis of Rights of First Refusal

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by

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Abstract

A right of first refusal requires the owner of a property to offer the property to the rightholder on the same terms as those offered by that third party before the owner can sell the property to a third party. A right of first offer requires the owner of a property to let the rightholder make an offer to purchase the subject property; if the owner rejects that offer, the owner can sell the property to a third party only at a price above the one offered by the rightholder.

This paper models the value of such first purchase rights at the time of their potential exercise. Modeling this ex post value is important since: the factors that determine the ex post value of first purchase rights also affect how much one should pay or accept for such rights ex ante, at the time when they are contracted; the model highlights the significance of certain features in the design of these rights, certain environmental features, and the relation of design and environmental features to each other; the ex post value of a right determines the amount of damages payable if the right is breached; and the model sheds light on why such rights are granted and how they enhance efficiency.

The main results are:

(i) Rights of first refusal are more valuable than rights of first offer.

(ii) If transaction costs are compensable, first purchase rights have the highest value when bargaining skills are relatively evenly distributed.

(iii) The fact that transaction costs are uncompensable increases the value of first purchase rights; this increase is more pronounced for a right of first refusal than for a right of first offer.

(iv) Imperfect information by rightholder over the value placed on the subject property by a third party reduces the value of a right of first offer and has no effect on the value of a right of first refusal

(v) Imperfect information by a third party on the value placed on the subject property by rightholder may increase or reduce the value of a right of first refusal and has no effect on the value of a right of first offer.

(vi) First purchase rights may enhance efficiency by: reducing seller's incentives to engage in strategic search for certain third-party buyers, improving rightholder's incentives to take certain steps to increase the value of the property, and reducing the costs associated with strategic bargaining.

Introduction

This paper presents an economic analysis of rights of first refusal. A right of first refusal requires the owner of the property subject to the right to offer the property to the rightholder on the same terms as those offered by a third party before the owner can sell the property to that third party. A close cousin to the right of first refusal is the right of first offer. Before an owner can sell property subject to a right of first offer, the rightholder must be given the chance to make an offer for the property. The owner can then either accept the offer; or the owner can sell the property to a third party, but only at a price above the one offered by the rightholder. We will refer to rights of first refusal and rights of first offer collective as first purchase rights.

First purchase rights are commonly employed in a variety of contractual settings. They are found, among others, in real estate sale and lease contracts, in agreements among shareholders of a closely-held company, in joint ventures, in franchise agreements, and in management agreements. Despite their common use, however, these rights have not received much attention in the law and economics literature.[1]

The very existence of first purchase rights poses a quandary. Assume that seller S is considering the sale of property Y and knows that a third party, B, would be willing to pay $1,000,000. Even in the absence of first purchase right, S would want to offer Y to rightholder R to see whether the R will beat the terms offered by B, say, by offering $100 more. How then does the first purchase right benefit R? Is the answer merely that R has to pay $100 more to beat, rather than merely match, B's offer?

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[1] No other article has modeled the value of first purchase rights. For a general discussion of rights of first refusal, their uses and purposes, see David I. Walker, Rethinking Rights of First Refusal, forthcoming __ Stan. J. of L., Business & Fin. ___ (1999). For an analysis of an "option to match" (a type of first sale right) in the salt market, see Victor P. Goldberg, The *International Salt* Puzzle, 14 Res.in L. & Econ. 31 (1991).

This paper provides a model of first purchase rights to analyze their value to a rightholder at the time of potential exercise. This focus on the ex post value of these rights is important for a number of reasons. First, by identifying the factors that determine the ex post value of first purchase rights, the model helps assess how much one should pay or accept for such rights ex ante, at the time when they are contracted. Second, the factors that determine the value of these rights highlights the significance of certain features in the design of these rights, certain environmental features, and the relation of design and environmental features to each other. Third, the ex post value of a right determines the amount of damages payable if the right is breached. Fourth, the model sheds light on why such rights are granted and how they enhance efficiency.

Part I of the paper presents a model of first purchase rights. Part II examines the value of first purchase rights when parties have perfect information about the value attributed to the subject property by the other parties. Part III examines the value of these rights under imperfect information. Part IV considers how first purchase rights enhance efficiency. Part V concludes.

I. The Model of First Purchase Rights

Let S be the owner of property Y subject to first purchase right. Let R be the holder of the right and B be a potential buyer of Y. If S has granted R a right of first refusal (RFR), S is obligated to offer Y to R at the same terms as those offered for Y by B before S may sell Y to B,. Assume, for simplicity, that there is only one term -- price -- that is relevant with respect to the sale of Y. Let p° be the price at which S has agreed (subject to R's right of first refusal) to sell Y to B.

If S has granted R a right of first offer (RFO), S is obligated to give R an opportunity to make an offer for Y. Let R's offer price be p'. If S rejects R's offer, S may sell Y to B only at a price $p>p'$.[2]

[2] Rights of first offer sometimes specify instead that S proposes a price p' which R may accept. If R rejects the offered price, S may sell the subject property to B only at a price $p \geq p'$.

Let s, r, and b be the respective values of Y to S, R, and B, respectively. (In the case of S, s excludes any portion of value derived from the sale of Y to R or B.) For simplicity, assume that there are a large number of other parties who value Y at the same price as does B.[3]

Let $t>0$ be the amount of transaction costs (known to S, B and R) that B would incur if she purchases (or, in case of RFR, offers to purchase) Y.[4] Let $b^*=b-t$. While we do not formally model the effect of transaction costs incurred by R and S, we will on occasion remark on these effects.

Let g be the amount of bargaining surplus obtainable jointly to R and S if they arrive at an agreement regarding the disposition of Y. That is, g is the difference between the joint wealth of R and S if they arrive at such an agreement and their joint wealth if they do not. Assume that R and S will arrive at an agreement that maximizes g whenever $g>0$. (In other words, strategic bargaining will not prevent R and S from maximizing their joint wealth.) R and S share g in fixed proportions, with S taking $\alpha*g$ and R taking $(1-\alpha)*g$, and $0\leq\alpha\leq1$. The value of α is independent of r, b, and s and is known to R and S.

For purposes of Part II, assume that s, r, and b are known to each of S, R, and B. This assumption will be relaxed in Part III.

I. First Purchase Rights under Perfect Information

(a) Conditions under which RFR and RFO possess value

Proposition 1: RFR and RFO do not have value unless $r>b^*>s$.

Proof: See Appendix

[3] This assumption does not change the qualitative results, but simplifies the derivation of p° and p'.

[4] For simplicity, assume that t is incurred by B upon the signing of an agreement with S to purchase Y (subject to R's rights).

Remarks:

A first purchase rights has no value if either seller values the subject property more than a third-party buyer or a third-party buyer would offer terms that the rightholder does not want to match.

(b) Values of RFR and RFO if r>b*>s

To determine the value of a first purchase right, we need to consider the degree to which seller can assume the payment of the transaction costs incurred by buyer in making a bid. While seller can in principle agree to compensate buyer for its transaction costs, such an agreement creates several practical difficulties. Specifically, it creates a moral hazard problem (buyer may incur greater costs than is efficient) and a fraud problem (buyer may overstate its costs). The agreement providing for the first purchase right may also restrict seller's right to make such payment.

Rather than incorporating these difficulties into the model, we will consider the two polar cases. First, we consider the case where seller is be able to compensate buyer for the transaction costs and such compensation creates no secondary effects. Then, we consider the case where seller is not able to compensate buyer for these transaction costs.

(i) Seller can compensate buyer for t≥0

Proposition 2: If r>b, the value of a RFR is the lower of [α(r-b); (1-α)(b*-s)]. If r < b, a RFR has no value.

Proof: See Appendix.

Remarks:

1. The value of a right of first refusal derives from its effect on seller's options other than to sell the subject property to rightholder. Without a right of first refusal, seller can sell the subject property to a third-party buyer. The price the third-party buyer would be willing to pay constitutes one of the baselines for a subsequent negotiation to sell the subject property to a

rightholder at a higher price. With a right of first refusal, seller could still agree to sell the subject property to a third-party buyer; but if seller agrees to such a sale, the rightholder can exercise its right of first refusal and buy the subject property at the same price as offered by the third-party buyer. That is, the price a third-party buyer would be willing to pay is no longer a *baseline for a subsequent negotiation* with the rightholder, but becomes the final price payable by the rightholder. A right of first refusal is valuable to the rightholder because the right adversely affects the bargaining choices of the seller.

2. The value of the right substantially depends on seller's relative bargaining skills (α). (Bargaining skills, in this context, refers to seller's ability to appropriate a high share of the bargaining surplus to herself.) Specifically, if seller's bargaining skills are very high (α=1), a right of first refusal has no value since seller can appropriate for herself, through skilled bargained, the value lost from the decline in her bargaining choices (i.e., by threatening not to sell to subject property unless rightholder pays her reservation price). If seller's bargaining skills are very low, a right of first refusal will also have no value since rightholder will pay no more than seller's next best alternative use (selling to buyer for a net price of b*). For intermediate levels of bargaining skills, however, a RFR is valuable, with the value depending on α and on the degree to which the seller's bargaining choices are affected (the value of b and t relative to s and r).

3. Proposition 2 and its proof also elucidate the effect of transaction costs incurred by rightholder and seller. Transaction costs by rightholder have an effect equivalent to lowering her reservation price (r) by the amount of such costs. Transaction costs incurred by seller in making an agreement with third-party buyer have an effect equivalent to compensable transaction costs incurred by third-party in making such an agreement. Transaction costs incurred by seller in selling the subject property to rightholder have an effect equivalent to raising the value seller attributes to holding the subject property (s).

Proposition 3: If $p_F > b$, the value of RFO is the lower of $[\alpha(r-b) - (1-\alpha)t; (1-\alpha)(b^*-s)]$. RFO has no value if $p_F \leq b$.

Proof: See Appendix.

Remarks:

For t=0, rights of first refusal and offer have the same value. For t>0, the value of a right of first refusal exceeds the value of a right of first offer by up to (1-α)t. The difference in values (in the case where both rights are valuable) lies in the first of the two expressions [α(r-b) for RFR; α(r-b)- (1-α)t for RFO] the lower of which determines the respective value of the rights. The first expressions are relevant when seller's optimal strategy is, respectively, to threaten to agree to sell the property to third-party buyer or to accept rightholder's offer of p'. In the case of a right of first refusal, this threat enables rightholder to appropriate a portion (1-α) of the gains (t) that rightholder and seller jointly obtain by coming to an agreement without seller having to make an agreement with buyer. In the case of a right of first offer, rightholder cannot obtain a portion of these gains (since she has to offer to seller the full price buyer would be willing to pay to preserve the value of the right).

(ii) Seller cannot compensate buyer for t and t>0

Proposition 4: The value of a RFR is (1-α)(b*-s)

Proof: See Appendix.

Remarks:

1. Uncompensable transaction costs make a right of first refusal more valuable. Uncompensable transaction costs effectively render the subject property unmarketable to a third-party buyer and thus eliminate seller's option to agree to sell the subject property and have rightholder exercise its right of first refusal. Seller's sole remaining option is to retain the subject property, which option forms the baseline for negotiations with rightholder.

2. If transaction costs are uncompensable, the value of a right of first refusal is highest if α=0 (i.e., if seller's bargaining skills are very low). In that case, seller will sell the property to rightholder for s and the value of the right of first refusal is given by b*-s.

Proposition 5: The value of a RFO is the lower of [α(r-b)+αt; (1-α)(b*-s)].

Proof: See Appendix.

Remarks:

Unlike in the case of a right of first refusal, uncompensable transaction costs do not substantially affect the value of a right of first offer. The reason is that rightholder, to preserve the value of its right, must offer to seller a price at least as the price the third-party buyer would be willing to pay. Uncompensable transaction costs, however, reduce that price from b (when transaction costs were fully compensable) to b*. As a result, rightholder must only offer p'=b* (rather than b*=b) to preserve the right. When accepting rightholder's offer of p' is optimal for seller, uncompensable transaction costs therefore increase the value of the right by the amount of the transaction cost (t).

Table 1 shows the values of first purchase rights with compensable and uncompensable costs.

Table 1: Values of RFR and RFO

	Value of RFR	Value of RFO
t ≥ 0 (compensable)	Lower of [α (r-b); (1-α)(b*-s)]–	Lower of [α (r-b)-(1-α)t;(1-α)(b*-s)]§
t > 0 (uncompensable)	(1-α)(b*-s)	Lower of [α (r-b)+αt; (1-α)(b*-s)]

– For r>b.; otherwise no value.

§ For p_F>b; otherwise no value.

Table 1 highlights the following results noted in the discussion above:

(i) the value of an RFR exceeds the value of an RFO;

(ii) if transaction costs are uncompensable, both an RFR and an become RFO more

valuable; and

(iii) the effect of uncompensable transaction costs is more dramatic for an RFR than for an RFO.

III. First Purchase Rights under Imperfect Information

This Part models the effect of imperfect information on the value of a first purchase right. This part models, for each right, one type of information imperfection. For rights of first offer, we model imperfect information by rightholder about the value of the subject property to a third-party buyer. For rights of first offer, we model imperfect information by a third-party buyer about the value of the subject property to the rightholder. We focus on these information imperfection because the relevant information relates to decisions that are specifically affected by the rights. In a right of first offer, rightholder has to decide at what price to make an offer (a decision not required in the absence of the right). In a right of first refusal, a third-party buyer has to decide whether to enter into an agreement that is subject to a right of first refusal. By contrast, seller's decisions, rightholder's decisions in a right of first refusal, and third-party buyer's decisions in a right of first offer are not specifically affected by the presence of the right and the relevant information. Moreover, seller is likely to be better informed than either rightholder or third-party buyer about the values attributed to the subject property by the other parties or better able to obtain that information. Thus, a model in which seller has less information that rightholder or third-party buyer is not likely to be very relevant.

(i) Imperfect Information by Rightholder

Assume that R does not know b, but knows that b is uniformly distributed between b_H and b_L with $r\_b_H > b_L\_s$.[5] For simplicity, we assume that t=0.

Proposition 6: The expected value of a RFO (and the optimal p' for R to offer) are as follows:

[5] The latter assumption is meant to exclude the uninteresting possibilities that $b_H > r$ (and any $p' < r$ will be rejected) or $b_L < s$ (and R's optimal offer is to offer $p'=s$).

Let _ = $(b_H+b_L)/2$

(a) For $b_H>s+\alpha(r-s)$ and $(b_L+\alpha r + b_H - \alpha b_H)/(1+\alpha) > b_H$:

$\alpha(r - \_) - (b_H-b_L)/2$

with $p'=b_H$

(b) For $b_H>(b_L+\alpha r + b_H - \alpha b_H)/(1+\alpha)>s+\alpha(r-s)$:

$[\ (p'-b_L)/(b_H-b_L)\ ] \times \{\ (p'+b_L)/2 + \alpha\ [\ r - (p'+b_L)/2] - p'\ \}$

with $p'=(b_L+\alpha r + b_H - \alpha b_H)/(1+\alpha)$

(c) For $b_H >s+\alpha(r-s)>(b_L+\alpha r + b_H - \alpha b_H)/(1+\alpha)$:

$[\ (p'-b_L)/(b_H-b_L)\ ] \times \{\ (p'+b_L)/2 + \alpha\ [\ r - (p'+b_L)/2] - p'\ \}$

with $p' = s+\alpha(r-s)$

(d) For $s+\alpha(r-s)\_b_H$: $(1-\alpha)\ (\_ - s)$

with $p'=b_H$

Proof: See Appendix.

Remarks:

1. Rightholder's imperfect information over the level of b reduces the (expected) value of a right of first offer. In deciding what price p' to offer to seller, rightholder has to balance conflicting objectives: If p' is set below b, seller will reject rightholder's offer and the right of first offer will lose its value (since seller could now freely sell the subject property to third-party buyer); if p' is set above b, seller may accept rightholder's offer and sell the subject property for a higher price as seller would have been able to if rightholder made a lower offer. Since rightholder will sometimes set p' too high or too low (relative to where p' would be set under perfect information), the right of first offer will have a lower (expected) value.

These problems are reflected in Proposition 6 as follows. For (a): rightholder will generally set p' above b, reflected in reduction in the value of the right by $(b_H-b_L)/2$, which represent the difference between $p'=b_H$ and the expected value of b. For (b) and (c): rightholder will set p' below b with a probability of $(b_H - p')/(b_H-b_L)$, causing the RFO to have value only with probability of $(p'-b_L)/(b_H-b_L)$; even if the RFO has value, that value will lower than in the corresponding case of perfect information, reflected in the subtraction of p', the price rightholder

has to pay to preserve the value of the right (rather than of $(p'+b_L)/2$, the expected value of b in this case). For (d): $s+\alpha(r-s)$ is so high that both under perfect and imperfect information, rightholder can make an offer that is always rejected, and the right has the same value as under perfect information.

2. For t=0, imperfect information by rightholder would *not* reduce the value of an RFR. With a right of first refusal, rightholder can either negotiate with seller under seller's threat not to sell the property (in which the sale price is independent of b) or can wait until seller comes forward with an offer by third-party buyer (in which case the terms of the offer will reveal b).[6]

(ii) Imperfect Information by Third-Party Buyer

The information set of third-party buyer is relevant in the case of a right of first refusal only if t>0 and uncompensable. Where t=0 or compensable, we have shown that seller will compensate third-party buyer for t and that, given such compensation, third-party buyer will offer to pay b for the property regardless of her beliefs as to r.

If t>0 and uncompensable, imperfect information matters if, given B's information set, the probabilities that $b^*>r$ and that $b^*\leq r$ are positive. Otherwise, the property will either be unmarketable to third-party buyer and the right will have no value.

Assume that t>0 and uncompensable, B does not know r, but knows that b is distributed between r_H and r_L with $r_H>b^*>r_L>s$. Let $Pr(b^\wedge>r)$ be the probability that $b^\wedge$ exceeds r.

Proposition 7: Let $b^\wedge$ satisfy the equality $b^\wedge = b - t/Pr(b^\wedge>r)$.
If the equality has no solution or $s+\alpha(r-s)>b^\wedge$, RFR has a value of $(1-\alpha)(b^*-s)$.
If the equality has a solution and $s+\alpha(r-s)<b^\wedge$ and $r<b^\wedge$, RFR has no value.

[6] Even if t>0 and compensable, rightholder at most loses the share of the joint gains if rightholder and seller had come to an agreement without seller having to solicit an offer from third-party buyer; and if t>0 and uncompensable, seller's only option is to sell to rightholder and the sale price is independent of b.

If the equality has a solution and $s+\alpha(r-s)<b^$ and $r>b^$, RFR has a value of

$b^* - b^ + \alpha(r-b^*)$ if $r>b^*$

$r - b^$ if $r<b^*$

Proof: See Appendix.

Remarks:

1. Imperfect information by third-party buyer can increase or decrease the value of a right of first refusal. On one hand, imperfect information may deter a third-party buyer from making any agreement with seller or reduce the price third-party buyer is willing to pay. To that extent, imperfect information increases the value of a right of first refusal. On the other hand, however, a third-party buyer with imperfect information may be willing to make an agreement with seller in circumstances where she would not be willing to do so if she had perfect information. To that extent, imperfect information raises the value of a right of first refusal. This latter effect is likely to dominate the former where seller's bargaining skills (α) are low and transaction costs (t) are low relative to the difference in value of the subject property to third-party buyer and seller (b-s).

2. With imperfect information, rightholder may end up buying the subject property even though a third-party buyer values it more than rightholder.

IV. Efficiency Effects of Rights of First Refusal and Rights of First Offer

The foregoing examination of the value of first purchase rights focused on the time of potential exercise. At that time, the potential value of these rights derives from a lowering the price a rightholder may have to pay to buy the subject property. This lower price, of course, is (ex post) a mere wealth transfer from the seller to the rightholder and does not constitute an efficiency increase.

On the other hand, first purchase rights involve certain costs. These costs include not merely the costs of negotiating over and drafting the precise terms of such rights (which may not be high), but also the costs associated with disputes over such rights. A review of reported cases dealing with rights of first refusal or offer indicates that disputes -- over the validity of such rights, over whether the right has been triggered, and over whether the rightholder has taken all

the required steps to exercise the rights -- are, at least as an absolute matter not rare occurrences. Thus, in the absence of any commensurate efficiency gains, rights of first refusal or offer would be efficiency-reducing.

As an initial matter, first purchase rights are likely to enhance efficiency only in circumstances where it is ex ante likely that these rights are ex post valuable: that is, when rightholder is likely to value the property more highly than a third party and a third party is likely to value it more highly than seller. In many circumstances in which first purchase rights are granted -- to shareholders in closely-help companies, among joint ventures, to holders of adjoining real property -- it is likely that first purchase rights will be ex post valuable.

That first purchase rights are likely to be valuable ex post does, of course, not explain how they promote efficiency. The model, however, points to several reasons why a first purchase right may be (ex ante) efficiency enhancing.

(a) Incentives for Rightholder

Rights of first refusal or offer may enhance efficiency through their effect on the incentives of rightholder prior to the time the right becomes exercisable. At such time, rightholder may be able to take certain steps that would increase the value of the subject to rightholder (r), though not its value to seller or a third party (s and b). Whether rightholder takes such steps depends among other factors, on the price rightholder expects to pay for the subject property. The model indicates that this price is less sensitive to the value of the subject property to rightholder (r) when rightholder has a first purchase right.[7]

Specifically, absent a first purchase right, the price the (putative) rightholder pays for the subject property increases by:

α for every unit increase in r

$(1-\alpha)$ for every unit increase in b.

[7] The sensitivity of the purchase price to r, b, and s is given by the first derivative of the price on r, b, and s, respectively.

With a first purchase right, the price rightholder pays increases by:

α or 0 for every unit increase in r

0 or 1 for every unit increase in b

(1-α) or 0 for every unit increase in s.

To the extent that rightholder can take actions that either (i) affect the value of the subject property to herself, but not to any other party or (ii) affect the value of the subject property to herself and to a third-party buyer, but not to seller, the presence of a first purchase right increases rightholder's incentives to take such actions.

Providing such incentives to rightholder are likely to be important in a variety of contexts in which first purchase rights are granted. Consider, for example, a case where R leases half a floor of building as retail sales space and obtains a right of first offer on the remainder of the floor. During the term of the lease, R can take several actions that increase the value of leasing the remaining floor space to herself without affecting the value of that space to the landlord or to a third party. Similarly, consider the case of a closely-held corporation where one of the shareholders (R) actively manages the business and the other shareholder (S) is close to retirement. Upon retirement, S will want to sell her share in the corporation. Until S's retirement, R can take several actions that, at the time of S's retirement, increase the value of the corporation to herself and to a third party, but would not equivalently to S. it is likely that XYZ may expand its operations which would increase XYZ's needs for retail space.[8]

[8] In this context, a right of first refusal or offer serves similar purposes as an option to buy. In fact, options are commonly employed in this context. A right of first refusal or offer may, however, for several reasons be preferable to an option. For example, an option with a fixed exercise price may adversely affect *seller's* incentives to take steps that would increase the value of the subject property and it may be difficult to specify a variable exercise price that takes proper account of any such steps.

(b) Interrelated Values

Another way in which first purchase right may enhance efficiency relates to the possibility that value the wealth of the rightholder is affected by the identity of the owner of the subject property. In many contexts where rights of first refusal or offer are common -- for example, in joint ventures, closely-held corporations, or franchises -- the possibility of such interrelated values is obvious.[9]

Viewed from this perspective, a sale of the subject property to a third party can confer negative or positive externalities on rightholder. This creates the potential for strategic behavior on the part of seller. Seller may threaten to sell the subject property to a third party whose ownership of the subject property would adversely affect rightholder (even if such party is not willing to offer more for the subject property than another party) in order to improve its bargaining position with rightholder. Such a strategy may reduce efficiency for two reasons. First, the strategy may for some reason fail (due to strategic bargaining or because seller overestimated the price rightholder would be willing to pay) and seller may sell the subject property without taking account of the externalities to rightholder. Second, even if seller ends up selling the subject property to rightholder, seller may incur costs in searching for a third party whose ownership of the subject property adversely affect rightholder, which costs constitute efficiency losses. The presence of a first purchase right eliminates these potential inefficiencies.

(c) Strategic Bargaining

First purchase rights may enhance efficiency by reducing the expected costs resulting from strategic bargaining between seller and the (putative) rightholder. By cost from strategic bargaining, I mean the efficiency losses resulting from a failure by seller and rightholder to arrive at a mutually advantageous agreement regarding the sale of the subject property or from excessive costs of arriving at such an agreement. (The model in Parts I to III assumed that strategic bargaining does not result in costs.)

Strategic bargaining is of concern in the circumstances where the model has identified

[9] In this context, rightholder may buy the property to resell it to a preferred third party.

first purchase rights as relevant: where the rightholder values the subject property more highly than a third-party buyer. By contrast, where rightholder and third-party buyers value the subject property as approximately the same price (e.g., in the sale of commodities), strategic bargaining cannot occur.

Moreover, strategic bargaining may be of special concern where the wealth of the rightholder is affected by the identity of the owner of the subject property. Absent a first purchase right, such a case may require a complex (and dififuclt to negotiate) three-party agreement between seller, rightholder and buyer (e.g., an agreement in which rightholder pays seller to sell the property to buyer 1 for a lower price rather than to buyer 2 for a higher price) to assure that the parties' wealth is maximized.

The presence of first purchase rights may alleviate the costs of strategic bargaining. Specifically, to the extent that the presence of first purchase right leads seller to sell the property to a third party (triggering a right of first refusal) or to accept rightholder's offer made pursuant to a right of first offer, the potential for strategic bargaining is eliminated. In addition, where the wealth of the rightholder is affected by the identity of the owner of the subject property, a first purchase right protects the interest of rightholder without the need of a three-party agreement.

Conclusion

This paper has identified several factors affecting the value of first purchase rights. Specifically, the value of first purchase depends on: the relative valuations of the property subject to the first purchase right; the relative bargaining skills of seller and rightholder; whether the right takes a form of right of first refusal or a right of first offer; whether seller can compensate a third party for the transaction costs the third party would incur in agreeing to purchase a property subject to the right; and whether the third party and rightholder have perfect information over the valuation of the subject property by the other party.

Among the specific results worth highlighting are the following:

1. In transaction costs are compensable, first purchase rights have no value when bargaining skills are highly unevenly distributed -- that is, when either seller or rightholder are so skilled that they can induce the other party to, respectively, pay or accept their reservation price for the subject property.

2. The value of a right of first refusal exceeds the value of a right of first offer.

3. Other things being equal, the fact that transaction costs are uncompensable increases the value of first purchase rights. However, the value of a right of first refusal will increase by more than the value of a right of first offer.

4. Imperfect information by rightholder over the value placed on the subject property by a third party reduces the value of a right of first offer and has no effect on the value of a right of first refusal. Imperfect information by a third party on the value placed on the subject property by rightholder may increase or reduce the value of a right of first refusal and has no effect on the value of a right of first offer.

First purchase rights may enhance efficiency in three ways: they may reduce seller's incentives to engage in strategic search for a third-party buyer where the rightholder's wealth is depends on who owns the subject property; they may improve rightholder's incentives to take steps that would increase the value of the subject property to herself and to a third party; and they may reduce the costs associated with strategic bargaining. Each of these ways comports with circumstances in which first purchase rights are frequently encountered.

Appendix

Proof for Proposition 1: If $s>b^*$, S will not want to sell the subject property to B and the presence of an RFR or RFO becomes moot. If $b^*>s>r$ or $b^*>r>s$, competition among buyers insures that S could sell the subject property to B for b^*. As $b^*>r$, neither RFR nor RFO would block such a sale.

Proof for Proposition 2: To determine the value of an RFR or RFO, we must first establish the price p_F at which S could sell the subject property absent any contractual restriction.

Lemma 1: Absent contractual restriction, S will sell the subject property to R for:

$$p_F = b^* + \alpha(r-b^*)$$

Proof : Absent agreement with R, competition among buyers assures that S could sell to B at a net price of b^*. Thus, the joint gains to S and R from selling to R rather than B are $g=r-b^*$. S will obtain a fraction α of these gains and thus sell to R for $b^* + \alpha(r-b^*)$.

With an RFR, S can pursue two strategies (yielding different threat points and resulting in different joint gains) in bargaining with R. First, S can threaten not to sell the subject property at all. The result of bargaining with this threat are derived in Lemma 2.

Lemma 2: If S threatens not to sell, S will sell the subject property to R for $s + \alpha(r-s)$

Proof: If S threatens not to sell, $g=r-s$. S will obtain a fraction α of these gains and thus sell for $s + \alpha (r-s)$.

Second, S can threaten to agree to sell the subject property to B, leaving R with the option to exercise its RFR. The results of bargaining with this threat are derived in Lemma 3.

Lemma 3: If S threatens to sell to B, S will sell the subject property to R for $b^* + \alpha t$

Proof: Since B knows that R will exercise its RFR, S will have to compensate B for t. Competition among buyers assures that, if S offers such compensation, B would agree to buy the subject property for b. If $b \leq r$, R would exercise its RFR and acquire the property for b (netting b^* to S). The joint gains from bargaining in this case are $g=t$ (the transaction costs that B did not have to incur) and S will sell to R for $b^* + \alpha t$.

S will pursue the strategy that yields the higher sales price. The value of RFR is given by

the difference between the sale price absent contractual restriction and the higher of [s + α(r-s); b* + αt], which is the lower of:

(i) $b^*+\alpha(r-b^*) - [s+\alpha (r-s)] = b^*-\alpha b^* + \alpha r - s +\alpha s - \alpha r = (1-\alpha) (b^*-s)$.

(ii) $b^*+\alpha(r-b^*) - (b^* + \alpha t) = \alpha(r-b^*) - \alpha t = \alpha(r-b)$.

If b > r, R would not exercise its RFR. The joint gains from bargaining in this case are g=r-b* and S will sell to R for b* + α(r-b*), the same price at which R would buy the property absent an RFR. Thus, the RFR has no value.

Proof for Proposition 3: To determine the value of an RFO, we first to have derive the optimal price p' that R will offer to S.

Lemma 4: If $p_F > b$, p'=b. If $p_F \leq b$, $p' \leq p_F$.

Proof: An offer of p'=b is sufficient to prevent S from selling the subject property to B (since B would not be willing to offer a price p>b). Thus, R has no reason to offer a price p'>b. Offering a price p'<b would enable S to sell the property to B for b (a price B would be willing to pay if compensated for t). The property would thus be freed from the contractual restriction. Lemma 1 shows that in the resulting bargaining, S would sell the property to R for $p_F = b^* + \alpha(r-b^*)$. If $p_F > b$, it is optimal for R to offer p'=b. If $p_F \leq b$, it is optimal for R to offer any $p' \leq p_F$.

We now turn to deriving the value of a RFO for $p_F > b$ and p'=b. With an offer of p'=b, S can pursue two strategies. Accept the offer and sell the property to R for b. Or reject the offer and bargain with the sole threat not to sell the property. Lemma 2 has shown that under in case S will sell the subject property to R for s + α(r-s). S will pursue the strategy that yields the higher price. The value of RFO is given by the difference between the sale price absent contractual restriction and the higher of [s + α(r-s); b], which is the lower of:

(i) $b^*+\alpha(r-b^*) - [s+\alpha (r-s)] = b^*-\alpha b^* + \alpha r - s +\alpha s - \alpha r = (1-\alpha) (b^*-s)$.

(ii) $b^*+\alpha(r-b^*) - b = b^*+\alpha(r-b^*) - b^* - t = \alpha(r-b^*) - t = \alpha(r-b)- (1-\alpha)t$.

If $p_F \leq b$ and $p' \leq p_F$., the subject property will be freed from its contractual restriction and the RFO has no value.

Proof For Proposition 4: With a RFR, B will not make a bid (and incur cost t which are

uncompensable) since B knows that R will exercise its RFR. Thus, S only threat is not to sell the property. Lemma 1 and 2 give the respective prices at which S would sell the property to R absent RFR and with the threat not to sell. The value of RFR is given by:
$b^*+\alpha(r-b^*) - [s+\alpha (r-s)] = b^*-\alpha b^* + \alpha r - s +\alpha s - \alpha r = (1-\alpha) (b^*-s)$.

Proof for Proposition 5: To determine the value of an RFO, we first to have derive the optimal price p' that R will offer to S.

Lemma 5: $p'=b^*$

Proof: The proof in analogous to the proof for Lemma 4, taking into account that, with uncompensable transaction cost, B would not be willing to pay more than b*: R has no reason to offer a price $p'>b^*$; and offering a price $p'<b^*$ would enable S to sell the property to B, thus freeing it from the contractual restriction, and forcing R to pay more than b* (Lemma 1).

The value of a RFO for $p'=b^*$ depends on the sale prices S derives from (i) accepting the offer and selling the property to R for b* and (ii) rejecting the offer, bargaining with the threat not to sell the property, and selling the subject property to R for $s + \alpha(r-s)$ (Lemma 2). S will pursue the strategy that yields the higher price. The value of RFO is given by the difference between the sale price absent contractual restriction and the higher of $[s + \alpha(r-s); b]$, which is the lower of:
(i) $b^*+\alpha(r-b^*) - [s+\alpha (r-s)] = b^*-\alpha b^* + \alpha r - s +\alpha s - \alpha r = (1-\alpha) (b^*-s)$.
(ii) $b^*+\alpha(r-b^*) - b^* = \alpha(r-b^*) = \alpha(r-b)+\alpha t$.

Proof for Proposition 6: To determine the expected value of a right of first offer under imperfect information, depends for on the difference between the expected sale price of the subject property without a RFO -- $(b_H+b_L)/2 + \alpha [r - (b_H+b_L)/2]$ -- and the expected sale price with the RFO. To proof Proposition 6, it will be helpful to proof the following Lemma 6:

Lemma 6: For any z with $b_H \geq z \geq b_L$, $(b_H+b_L)/2 + \alpha [r - (b_H+b_L)/2]=$
$[(z-b_L)/(b_H-b_L)] \times \{(z+b_L)/2 + \alpha [r - (z+b_L)/2]\}+[(b_H-z)/(b_H-b_L)] \times \{(z+b_H)/2 + \alpha [r - (z+b_H)/2]\}$

Proof:

$[(z-b_L)/(b_H-b_L)]$ x $\{(z+b_L)/2 + \alpha [r - (z+b_L)/2]\}+[(b_H-z)/(b_H-b_L)]$ x $\{(z+b_H)/2 + \alpha [r - (z+b_H)/2]\}=$

$\alpha r + z/2 - \alpha z/2 + [(z-b_L)/(b_H-b_L)]$ x $(1-\alpha)b_L/2 + [(b_H-z)/(b_H-b_L)]$ x $(1-\alpha)b_H/2=$

$\alpha r + (1-\alpha)/2$ x $\{z + [(z-b_L)/(b_H-b_L)]$ x $b_L + [(b_H-z)/(b_H-b_L)]$ x $b_H\} =$

$\alpha r + (1-\alpha)/2$ x $[(zb_H - zb_L + zb_L - b_L b_L + b_H b_H - zb_H) / (b_H-b_L)] =$

$\alpha r + (1-\alpha)/2$ x $[(- b_L b_L + b_H b_H)/ (b_H-b_L)] =$

$\alpha r + (1-\alpha)/2$ x $(b_H+b_L) =$

$(b_H+b_L)/2 + \alpha [r - (b_H+b_L)/2]$

To determine the expected sale price with an RFO, we first have to derive the optimal level of p'. Optimal p' will have the following properties:

(i) Optimal p' will never exceed b_H as p'=b_H is sufficient to prevent S from threatening to sell the subject property to B.

(ii) Optimal p' will never be less the b_L as any p'<b_H would result in a rejection of the offer and free the subject property from the contractual restriction.

(iii) Optimal p' will never be less than $s+\alpha(r-s)$ as since $s+\alpha(r-s)$ would be the price R pays if S rejects the offer and R cannot gain by making an offer p'<$s+\alpha(r-s)$.

Lemma 7: For b_H _p'_b_L and b_H _p'_$s+\alpha(r-s)$, the optimal p' = $(b_L +\alpha r)/(1+\alpha)$

Proof: Within the constraints, S will accept R's offer if p'_b; if p'<b, S will reject offer and the conditional expected sale price is $(b_H+p')/2 + \alpha [r - (b_H+p')/2]$. The expected sale price given p' is therefore:

$[(p'-b_L)/(b_H -b_L)] \times p' + [(b_H - p')/(b_H -b_L)] \times \{ (b_H+p')/2 + \alpha [r - (b_H+p')/2] \}=$

$[1/(b_H -b_L)] \times \{ [(p'-b_L) \times p'] + (b_H - p') \times [\alpha r + (1-\alpha)(b_H +p')/2] \}$

Differentiating yields: $[1/(b_H -b_L)] \times [2p' - b_L - \alpha r - (1-\alpha)p' - (1-\alpha)b_H]$ which equals 0 at $p' = (b_L +\alpha r + b_H - \alpha b_H)/(1+\alpha)$. As the second derivative is positive, the expected price has a minimum at $p' = (b_L +\alpha r + b_H - \alpha b_H)/(1+\alpha)$.

We now turn to deriving the value of an RFO

(a) For $b_H > s+\alpha(r-s)$ and $(b_L +\alpha r + b_H - \alpha b_H)/(1+\alpha) > b_H$

Optimal p'=b_H. S will accept R's offer regardless of the value of b and sell the subject property to R for b_H.

The value of an RFO is thus: $\alpha(r - \_) - (b_H-b_L)/2$

(b) For $b_H > (b_L + \alpha r + b_H - \alpha b_H)/(1+\alpha) > s+\alpha(r-s)$

Optimal $p' = (b_L + \alpha r + b_H - \alpha b_H)/(1+\alpha)$. S will accept R's offer if p'_b; if p'<b, S will reject offer and the conditional expected sale price is $(b_H+p')/2 + \alpha [r - (b_H+p')/2]$. The expected sale price is thus: $[(p'-b_L)/(b_H -b_L)] \times p' + [(b_H - p')/(b_H -b_L)] \times \{ (b_H+p')/2 + \alpha [r-(b_H+p')/2]\}$. From Lemma 6 (substituting p' for z), it follows that the value of the RFO is:
$[(p'-b_L)/(b_H -b_L)] \times \{ (p'+b_L)/2 + \alpha [r - (p'+b_L)/2] - p' \}$

(c) For $b_H > s+\alpha(r-s) > (b_L + \alpha r + b_H - \alpha b_H)/(1+\alpha)$

Optimal $p' = s+\alpha(r-s)$. S will accept R's offer if p'_b; if p'<b, S will reject offer and the conditional expected sale price is $(b_H+p')/2 + \alpha [r - (b_H+p')/2]$. The expected sale price is thus: $[(p'-b_L)/(b_H -b_L)] \times p' + [(b_H - p')/(b_H -b_L)] \times \{ (b_H+p')/2 + \alpha [r - (b_H+p')/2]$. From Lemma 6 (substituting p' for z), it follows that the value of the RFO is:
$[(p'-b_L)/(b_H -b_L)] \times \{ (p'+b_L)/2 + \alpha [r - (p'+b_L)/2] - p' \}$

(d) For $s+\alpha(r-s)\_b_H$:

Optimal $p'=b_H$ (or, for that matter, any $s+\alpha(r-s)\_p'\_b_H$). S will reject R's offer regardless of the value of b and sell the subject property to R at an expected price of $s+\alpha(r-s)$.

The value of an RFO is thus: $(1-\alpha)$ (_ - s)

Proof for Proposition 7: To proof Proposition 7, we first proof the following Lemma:

Lemma 8: B derives 0 expected gain from making an offer of p°= b^

Proof: B incurs cost of t from making an offer. If R does not exercise the RFR, B will derive gains of b-p°. For p°= b^, the costs of t equal expected gains of (b-b^)*Pr(b^>r).

Competition among buyers will cause B to we willing to make an offer of b^. If the equation b^ = b - t/Pr(b^>r) has no solution, there is no p° that B would be willing to offer. If $s+\alpha(r-s)>b^$, B would be willing to make an offer of b^, but S would not want to make an agreement with B at b^ triggering the RFR. In either case, S's optimal strategy is to threaten not to sell Y. As shown in Lemma 1 and 2, the RFR then has a value of $(1-\alpha)(b^*-s)$.

If $b^ > s+\alpha(r-s)$, S's optimal strategy would be to (threaten to) sell to B. If $b^$ exceeds r, R would not exercise its right or offer more than $b^$ and the RFR has no value.

If $b^ > s+\alpha(r-s)$ and $r>b^$, R would exercise the RFR and acquire Y for $b^$. If $r>b^*$, then, absent contractual restrictions, S would have sold Y to R for $b^*+\alpha(r-b^*)$ (Lemma 1). Thus, the value of the RFR is $b^* - b^ + \alpha(r-b^*)$. If $b^*>r>b^$ then, absent contractual restriction, S would not have sold to R. Thus, the value of the RFR is $r-b^$.

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If you are offered the Right of First Refusal, Should you accept?

-

An Investigation of Contract Design*

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Abstract

Rights of first refusal are contract clauses that, recognizing the incompleteness of contracts, are intended to provide the holder of a license or lease with some protection when the contract comes to an end. The simplest right of first refusal gives the right holder the ability to act *after* potential competitors. However, another common implementation of a right of first refusal requires the right holder to accept or reject some offers *before* potential competitors are given the same offer, and, if the right holder rejects the initial offer, allows the right to be exercised affirmatively only if competitors are subsequently offered a better deal (e.g. a lower price).

We explore, theoretically and experimentally, the impact this latter form of right of first refusal can have on the outcome of a negotiation. We show that, counterintuitively, the "right" embodied in this form of right of first refusal can work to the disadvantage of its holder. This suggests that applied contract design may benefit from the same kind of attention to detail that has begun to be given to practical market design.

JEL classification: C78, C91, K12

Keywords: Contract design, Right of First Refusal, Bargaining experiments

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1. Introduction

In January 2001, Paramount Studios and the National Broadcasting Company (NBC) had to renegotiate the broadcasting rights for the successful television show *Frasier*, after the term of the original agreement expired. NBC, as the incumbent network, had a Right of First Refusal as described in the following letter of January 23, 2001 from NBC to Paramount (Subramanian, 2001a, Exhibit 1):

> "This will confirm that our exclusive negotiation period will commence February 1, 2001. In order to confirm that we are both on the exact same page with respect to the negotiations for the renewal of 'FRASIER,' I am sending you this summary of the terms.
>
> 1. The first negotiation period lasts from February 1, 2001 to March 1, 2001. Both NBC and [Paramount] acknowledge that this negotiation period was not affected by any previous exploratory discussions (as confirmed in my fully-executed letter to you dated November 29, 2000).
>
> 2. If there is no agreement reached by March 1, 2001, Paramount will submit its last offer ('Last Offer') to NBC. If NBC rejects said Last Offer, Paramount is free to negotiate with third parties, subject to the matching rights of NBC set forth below.
>
> 3. If Paramount wants to license the series to a third party (including, without limitation, CBS), on financial terms less favorable to Paramount than the Last Offer, NBC has 10 days to match such terms. On the other hand, Paramount is free to license the show to a third party (including, without limitation, CBS) on financial terms equal to or more favorable than the last offer, without any further obligation to NBC.
>
> 4. If NBC's right to match an offer comes into play, NBC must match the aggregate, total financial value of the third party offer within 10 days of NBC's receipt of notice of the third party offer. Such financial value would include, without limitation, terms such as the term of the license fee, the number of episodes ordered, and any sharing of any revenue streams.
>
> 5. NBC's matching right continues until March 1, 2002.
>
> The above reflects our understanding of the agreement, and we are proceeding in reliance thereon."

Note the order of events in this right of first refusal, as captured in paragraphs 2 and 3 above. For simplicity, we will speak as if the only issue under negotiation is the price per episode that Paramount will receive. The specified order is as follows: First, Paramount negotiates with NBC. If NBC rejects Paramount's last offer, then NBC has

implicitly rejected any offers at a higher price, i.e., offers that are even more favorable to Paramount. Paramount is therefore free to reach an agreement at the refused price or higher with another network. However, if Paramount agrees to license the show to another network at a lower price (i.e., on terms that NBC has not yet refused), then NBC can exercise its right of first refusal to renew the show on NBC at that price.

This form of the right of first refusal was once standard in entertainment contracts of this kind, but has (at least in this form) not been included in the terms of many of the most recent contracts.[1] However it is not hard to find evidence suggesting that this order of events is commonly written into rights of first refusal. For example, it is found in the law governing sales of rental property in Britain, where many tenants of flats in England and Wales have the right to purchase their flat before the landlord can offer it to anyone else. The Landlord and Tenant Act of 1987 (as amended) contains a right of first refusal as follows.[2]

> "A landlord who wishes to dispose of property containing flats must give the qualifying tenants (mainly long leaseholders and regulated tenants) the opportunity to buy it and must tell them the price and other principal terms on which they are prepared to do so. … If the tenants do not accept the offer, the landlord can (in most cases) sell to anyone within a 12-month period provided that they offer the same interest on the same terms and **at no lower price** than the offer rejected by the tenants. If the landlord wishes to sell at a **lower** price or on different terms, they must first offer the property again to the tenants."

That is, British tenants too must exercise their right of first refusal at a price of the landlords' choosing before the property is offered to a third party, while retaining the right to exercise the right at lower prices until afterwards. We will call such a right a *Before and After Right of First Refusal* (BA-ROFR) to contrast it with a *Last Right of First Refusal* in which the right holder acts last (L-ROFR) or with a *right of first opportunity* in which the right holder always makes a decision before a third party. The Office of the Deputy Prime Minister states on their webpage that the British legislation

[1] Subramanian (2001a), and personal communication. There have been large changes in the organization of the industry that may account for this. As of 1993 networks were no longer legally constrained not to produce their own material, which resulted in an increase in in-house production. While networks moved upstream, studios started moving downstream by creating their own networks (e.g., Warner Brothers and Fox created WB, Paramount studios and United Television created United Paramount Network, UPN). Moreover, massive consolidations were seen in the 90's, for example Walt Disney Co. bought ABC, News Corp. acquired Fox Broadcasting, and Viacom bought CBS.

[2] See http://www.housing.odpm.gov.uk/order/refusal/02.htm.

implementing this BA-ROFR "strengthened the rights of leaseholders of privately owned blocks of flats." This suggests that the BA-ROFR was implemented with the intention of helping the right holders.

Interestingly, British housing law regards this form of BA-ROFR as interchangeable with a L-ROFR that can be exercised *after* a public auction. The regulations say "There is also a procedure for the landlord to sell their interest at public auction, whereby the tenant [the right holder] takes the place of the successful bidder." This latter implementation is a simpler (and quite common) right of first refusal, in which the right holder always makes his decision after any third parties.[3]

Bikhchandani, Lippman and Ryan (2005) show that when the right holder has the option to take the place of the successful bidder in an auction, the right is beneficial to its holder. The intuition in an ascending bid auction is that, in the absence of the right, the right holder would just be an ordinary bidder, and would win the asset only if he had the highest value of all the bidders, and would pay the second highest value. However, the right of first refusal in this case allows him to stay out of the bidding and claim the asset at the auction price whenever he has the first or second highest value (in which case the auction price will be the third highest value). Notice that this form of the right of first refusal (a L-ROFR) gives the right holder an unambiguous benefit, at the cost of efficiency (and of seller revenue) since the asset is sold at the third highest price, and doesn't always go to the bidder with the highest value.[4]

We show below, first theoretically and then experimentally, that the situation is different when the right of first refusal is implemented as a Before and After right (BA-ROFR), in which the right holder must refuse some offers which can then be offered to a potential competitor, while the right holder retains the right to match better offers. We will see how such a "right" can work to the holder's disadvantage. The intuition is simple: the presence of this right allows the owner of the asset to first offer the asset to the right holder at a relatively high price p, and, if this price is rejected, to present an

[3] For example, French national institutions have a L-ROFR, as described in connection with the recent sale of the private collection of the Surrealist painter André Breton (Gilsdorf, 2003): "Preemption is a unique feature of French art auctions. At the end of a sale, federally owned institutions like the Pompidou may match any final bid and claim the work for the state, depriving some collector of a hard-fought artistic trophy."

ultimatum to the third party, since the third party can buy the asset for price p, but any lower price will trigger the exercise of the right. The fact that the presence of the right strengthens the bargaining position of the asset owner when bargaining with third parties (who do not hold the right) also strengthens the position of the owner when he bargains with the right holder.

After exploring this property in a simple environment in which efficiency is not an issue, we will then turn to a richer environment in which we will see that this more complex right of first refusal (BA-ROFR) in fact enhances efficiency. This is in contrast to the right that allows the right holder to replace the high bidder (L-ROFR).

In the conclusion, we reflect on the use of theory and experiments in investigations of contract design. While rights of first refusal are of interest in their own right, our results suggest that contract design is likely to require the same attention to detail as market design as it moves from theory to application in the emerging area of design economics.[5]

2. Modeling the Before and After Right of First Refusal: Ultimatum and Reverse Ultimatum Games

Unless otherwise specified, the right of first refusal we speak of in the following sections will always be a before and after right, and hence, for brevity, we will sometimes speak of it simply as a Right of First Refusal (ROFR), rather than as a BA-ROFR.

Although the contract between Paramount and NBC (and the British Tenant Law) clearly lays out how and when the right of first refusal can be exercised, it does not otherwise attempt to impose a structure on how negotiations should be conducted, except to indicate that (at least in some parts of the negotiations) offers are made by the studio to the network (by the landlord to the tenants). Thus an equilibrium analysis of the ROFR within the framework of a formally specified game must make some necessarily arbitrary

[4] Efficiency is hurt even further if the existence of a buyer who holds a L-ROFR leads other potential bidders to stay away from the auction, as it might when bidding is costly.

[5] See Roth (2002), Wilson (2002), and Milgrom (2004) for discussions of market design, and e.g. Abdulkadiroğlu *et al.* (2005), Niederle and Roth (2005), and Roth *et al.* (2004, 2005) for discussions of recent design efforts.

assumptions about the details of negotiations. To avoid reaching a conclusion about the ROFR that depends on these arbitrary assumptions, we therefore conduct the analysis in terms of two bargaining games, the *ultimatum game*, and the *reverse ultimatum game*, described in detail below. In both of these games the studio will make offers to the network(s). But when the incumbent network does not have a ROFR, the perfect equilibrium prediction is that in the ultimatum game the studio will receive almost all of the revenues to be divided, and in the reverse ultimatum game the incumbent network will receive almost all the revenues. That is, when the network does not hold a ROFR, the perfect equilibrium predictions are that the network will do poorly if negotiations are conducted as in the ultimatum game, and well if they are conducted as in the reverse ultimatum game. Thus a parallel analysis of the effect of adding a ROFR to each game offers an opportunity to investigate its effect both in negotiation environments that are favorable to the network, and in environments that are not.[6] Analysis of the perfect equilibria of these games will reveal that giving the network a ROFR does not help it when it is predicted to do poorly without the right, and hurts it when it is predicted to do well without the right.[7] We will then see in an experiment that although the perfect equilibrium predictions do not do well as point predictions for the outcome of play, they successfully predict the direction in which the ROFR changes the outcomes.

To concentrate on the question of whether the ROFR is beneficial to its holder, we look first at environments in which efficiency issues do not arise.

[6] We have abstracted away from many issues of practical importance in bargaining, not least of which is the timing of transactions (an issue explored in this kind of bargaining by Gneezy *et al.* 2003). We are certainly not claiming here that timing issues are unimportant; for example in the British Landlord and Tenant Act, the process of making an offer to the tenants can last over four months. However, how a BA-ROFR can be harmful to the right holder can be seen most clearly by looking at bargaining, with or without this right, in the absence of other complications.

[7] Recently, attention has been given to models that better reflect the experimental evidence that ultimatum game outcomes robustly tend to be much nearer to even divisions than simple perfect equilibrium (in own payoffs) predicts, even when stakes are high (e.g.. Roth *et al.* 1991, Slonim and Roth 1995). Some of these models incorporate concerns for fairness and inequality in the formulation of an individual's utility, but retain the perfect equilibrium hypothesis (see e.g. Bolton and Ockenfels, 2000 or Fehr and Schmidt, 1999). Other models relax the equilibrium assumption and focus instead on boundedly rational learning (e.g. Erev and Roth, 1995). It appears that both of these formulations would retain the qualitative characteristics that we explore here. We will return to them briefly in our discussion of the data.

The ultimatum and reverse ultimatum games

For each of the two games described below, we consider bargaining by one proposer (the asset owner) and two responders (the potential buyers), and investigate the effect of giving the ROFR to the first responder. In each game, the proposer will have to divide 25 tokens. The proposer first proposes a division to the first responder, and, if no agreement is reached, then makes a proposal to the second responder. Any agreement will be between the proposer and one responder, i.e., the feasible agreements of the game are vectors of the form (*p,r1,0*) or (*p',0,r2*) where *p* or *p'* (the proposer's share) can be thought of as the negotiated price of the asset and *r1* and *r2* (first and second responders' potential shares) are all positive integers, and $p+r1=25 = p'+r2$. In the event that no agreement is reached, all three players receive *0* (but a successful agreement gives a positive payment to both parties to the agreement[8]). The rules for making proposals and reaching agreements differ between the two games as described next.

The ultimatum game with one responder: The ultimatum game has been widely studied in the laboratory since the experiment of Güth, Schmittberger, and Schwarze (1982). In the two-person version (which will arise as a subgame of our three person game), one proposer makes a single proposal to one responder over how to divide a fixed sum. If the responder accepts, both players receive the proposed payoffs, and if the responder declines, both players receive *0*. In our discretized version with strictly positive proposals, the unique subgame perfect equilibrium of this game is for the proposer to propose the division (*p,r2*) = (*24,1*), and for the responder to accept, so that the proposer receives almost all of the available wealth.

The ultimatum game with two responders (and no ROFR): In the ultimatum game with two responders and no ROFR, the proposer first proposes a division (*p,r1,0*) to the first responder. If the first responder accepts, this is the result of the game. If the first

[8] By making all feasible offers positive, we simplify the analysis at some points by avoiding indifference (between a zero payoff at agreement, and disagreement) that could lead to multiple equilibria.

responder declines, then the first responder receives *0* for the game, and the proposer now makes an offer to the second responder (*p',0,r2*), who accepts or declines as in the two-person ultimatum game. If the second responder rejects the offer, all players receive *0*.

This game has many Nash equilibria, but only one subgame perfect equilibrium, at which the proposer proposes (*24,1,0*) to the first responder, who accepts. Off the equilibrium path, the first responder accepts any offer made by the proposer, and if the first responder rejects the proposer's offer, the proposer proposes (*24,0,1*) to the second responder, who accepts any offer.

The ultimatum game with two responders and ROFR: Now consider the ultimatum game in which the first responder has the Right of First Refusal. The rules of this game are that the proposer first proposes a division (*p,r1,0*) to the first responder. If the first responder accepts, this is the outcome. If the first responder declines, the proposer now makes an offer (*p',0,r2*) to the second responder. If the second responder rejects the offer, then all players receive *0*. However, if the second responder accepts the offer, the outcome depends on whether the ROFR is activated or not. If $p' \geq p$ (i.e., if $r2 \leq r1$) then the ROFR is not activated (as the first responder has already rejected price *p*), and the proposer receives *p'*, the second responder receives *r2*, and the first responder receives *0*. However if $p' < p$ (i.e., if $r2 > r1$) then, following the second responder's acceptance, the ROFR is activated, and the decision returns to the first responder. If the first responder now accepts the offer, the outcome is (*p',r2,0*), i.e., the first responder receives *r2*, the payoff originally offered to the second responder, and the second responder receives *0*. Only if the first responder declines is the outcome (*p',0,r2*), i.e., only in this case can the second responder receive $r2 > r1$.

Although the ROFR changes the two responder ultimatum game from one in which the first responder is only called upon for one decision to a game in which he may be called upon for two decisions, it does not change the payoffs at a subgame perfect equilibrium. That is, we have the following result.

Theorem 1*: The unique subgame perfect equilibrium payoff of the one-proposer two-responder ultimatum game with ROFR is (24,1,0), i.e., it is the same as the unique subgame perfect equilibrium payoff of the game without ROFR.*

Sketch of proof: First consider the unique subgame perfect equilibrium for the one-proposer two-responder ultimatum game without the ROFR. Suppose the first responder rejects the offer (*p,r1,0*), with $p+r1 = 25$. The proposer then makes a take-it-or-leave it offer to the second responder. As with the standard two-person ultimatum game, the second responder will accept any positive offer. The proposer therefore offers the smallest feasible offer to the second responder, (*24,0,1*), which will be accepted. So, at the outset of the game, the proposer offers (*24,1,0*) to the first responder, knowing that if the first responder rejects, the second will accept (*24,0,1*). The first responder will accept, since otherwise he will get zero. The introduction of the ROFR does not change the subgame perfect equilibrium predictions, since at the subgame perfect equilibrium the right will never be activated. The proposer is therefore in the same situation as in the two-player ultimatum game, and never offers more than the minimum feasible amount of *1* token to the first responder in the ultimatum game with and without the ROFR.□

Of course, the well known experimental result for ultimatum games, to which we will return shortly, is that observed outcomes are, robustly, far from the perfect equilibrium, as small offers tend to be rejected (see e.g. Roth *et al.* 1991 or the survey of Roth, 1995).

The reverse ultimatum game with one responder: The reverse ultimatum game (RUG) was first proposed and studied experimentally by Gneezy, Haruvy, and Roth (2003). In the two-person version (which will arise as a subgame of our three person game), one proposer plays with one responder. The proposer proposes a division of the 25 tokens to the responder. If the responder accepts, then the game ends with this division as the outcome. If the responder rejects the offer, the proposer is then allowed to make another offer, as long as that offer is *strictly higher* by a minimum increment (*1* token), and as long as both players' proposed shares remain strictly positive. In addition, the proposer may end the bargaining at any point, in which case both players receive *0*.

That is, the game ends either when the responder accepts a proposal, or when, following a rejection, the proposer declines to make a better offer.[9] Gneezy *et al.* observe that the unique subgame perfect equilibrium division for this game is (*1,24*), i.e., the reverse of the two-player ultimatum game. The argument is straightforward: after any rejection by the responder, the proposer is left with the choice of making a better offer (and eventually receiving a payoff of at least 1), or ending the game and receiving *0*.

The reverse ultimatum game with two responders (and no ROFR): In the reverse ultimatum game with two responders and no ROFR, the proposer first proposes a division (*p,r1,0*) to the first responder. If the first responder accepts, this is the result of the game, and if the first responder rejects, then the proposer either makes a new offer (with strictly smaller *p* and higher *r1*), or decides to terminate bargaining with the first responder (in which case the first responder receives *0* for the game), and makes an initial offer to the second responder. This subgame now proceeds as a two-player reverse ultimatum game between the proposer and the second responder, i.e., the initial offer to the second responder *(p,0,r2)* may start with *p=24* and *r2=1* if the proposer wishes.

Gneezy *et al.* observe that in this version of the two-responder reverse ultimatum game, any division between the proposer and first responder can be achieved at a subgame perfect equilibrium. This multiplicity is driven by threats of the following form: The proposer offers (*p,r1,0*), with $p+r1 = 25$, to the first responder and "threatens" to switch immediately to the second responder if the first responder does not accept. Of course, the perfect equilibrium outcome of the subgame of bargaining with the second responder will be (*1,0,24*). So if the proposer believes that continued bargaining with the first responder following his initial rejection will yield *(1,24,0)*, it is sequentially rational for him to carry out his threat to switch to the second responder following any rejection. Therefore, any agreement (*p,r1,0*) with $p+r1 = 25$ can occur at a subgame perfect equilibrium.

However, one can achieve uniqueness of the subgame perfect equilibrium predictions by slightly perturbing the game so that offers (*p,r1,0*) to the first responder

[9] The game also ends if the responder rejects an offer of *24* tokens (i.e. a price of 1 token), since the proposer cannot make another offer without decreasing his own share to zero, and the rules require that all shares be positive.

must have $p \geq 2$ (i.e., $r1 \leq 23$). Offers to the second responder continue to require only that $p \geq 1$ (i.e., $r2 \leq 24$). The unique subgame perfect equilibrium payoff of this "perturbed" reverse ultimatum game is (*2,23,0*). Clearly, the uniqueness is driven by the elimination of the credibility of the threat to discontinue bargaining with the first responder in order to bargain with the second responder. It is now in the interest of the proposer to strike a deal with the first responder, since that would secure him a payoff of *2* instead of the payoff of *1* that he would get from the second responder.[10] Gneezy *et al.* conducted experiments with both perturbed and unperturbed games and found no behavioral differences. Outcomes of both games are always in the interior of the feasible agreements, never very near to the unique subgame perfect equilibrium of the perturbed game.[11]

The reverse ultimatum game with two responders and ROFR: Now consider the reverse ultimatum game in which the first responder has the Right of First Refusal. The rules of this game are the same as for the unperturbed game above, except at a subgame in which the first responder has rejected a last offer of (*p,r1,0*), and the second responder has accepted an offer of (*p',0,r2*) with $p' < p$ and $r2 > r1$, i.e., except when the second responder has accepted an offer that is more favorable than any offer the first responder had received (and rejected). In this case, the first responder's ROFR is activated, and the first responder may either accept this offer, in which case the game ends with the outcome (*p',r2,0*), or decline it, in which case the outcome is (*p',0,r2*). In contrast to the unperturbed reverse ultimatum game with two responders and no ROFR, the (perturbed or unperturbed) game with ROFR has a unique equilibrium payoff.

Theorem 2: *The unique subgame perfect equilibrium payoff of the (unperturbed) one-proposer two-responder reverse ultimatum game with ROFR is (24,1,0), i.e., it is the same as the unique subgame perfect equilibrium payoff of the one-proposer two-responder ultimatum game with and without the ROFR.*

[10] By the same token, the uniqueness of the (*24,1*) split in the two-player reverse ultimatum game is driven by the restriction that offers need to be strictly positive.

That is, the unique subgame perfect equilibrium payoff of the reverse ultimatum game *with* the ROFR, *(24,1,0)*, is qualitatively the opposite of the subgame perfect equilibrium payoff of the perturbed reverse ultimatum game without the ROFR *(2,23,0)*. Or, if we consider only the unperturbed reverse ultimatum games, then the addition of the ROFR changes the perfect equilibrium prediction from a multiplicity of outcomes, some of which are very good for the first responder, to a unique outcome that is the worst possible agreement for him, and the worst of the possible perfect equilibrium outcomes in the game in which he does not have the right. The addition of the ROFR thus completely changes the perfect equilibrium prediction for the reverse ultimatum game, to the disadvantage of the first responder, the right holder.

Sketch of proof: Suppose that the proposer's last rejected offer to the first responder was ($p,r1$,0) with $p + r1 = 25$. Any offer to the second responder with $p' < p$ (i.e., $r2 > r1$) would activate the right of first refusal. It cannot be in equilibrium for the first responder to reject an offer (originally made by the proposer to the second responder) that activated the right of first refusal, since then he would receive *0*. At a perfect equilibrium he will therefore always accept any offer triggered by the ROFR. The second responder would therefore reject all offers $r2 < r1$ and accept $r2 = r1$, the maximum offer to the second responder that does not activate the ROFR. The proposer therefore has to choose p (and hence $r1$) to maximize his payoff. The smallest $r1$ he can choose is *1*. Therefore the proposer proposes (*24,1,0*) to the first responder. The first responder accepts since no subsequent offer made to the second responder at equilibrium will activate his right of first refusal, as an offer of (*24,0,1*) would be accepted by the second responder. Therefore, since at a perfect equilibrium the first responder can never reject, the proposer is in the same situation as in the two-player ultimatum game, and never offers more than the minimum feasible offer of *1*. □

[11] However, they found that while the imposition of a deadline does not change the perfect equilibrium prediction, it moved the outcomes observed in experiments significantly closer to the perfect equilibrium outcome.

In summary, the before and after ROFR is not predicted to confer any advantages upon the first responder when he holds this right, neither in the ultimatum nor in the reverse ultimatum games. Once again, note that there are many necessarily arbitrary elements in the way we model this ROFR. The contract specifying how the right should enter the negotiations is, of course, quite incomplete on other aspects of the negotiations. So economic investigations of contract design, such as we undertake here, need to address a range of possibilities for the incomplete parts of the contract. We deal with that here by considering two models of negotiations, the traditional ultimatum game (UG) and the reverse ultimatum game (RUG), whose perfect equilibria span the range of predicted distributions of wealth. In Section 5 we will address the case of different private valuations by the buyers to analyze the efficiency implications of the ROFR.

3. Experimental Design

As described in the previous section, the basic experimental setup was a negotiation between one proposer and two responders over the division of *25* tokens (*1* token was worth \$0.05, and subjects were paid their accumulated profits from 20 games at the end of the experiment). The proposer first bargained with the first responder and only afterwards potentially interacted with a second responder. Each experimental session consisted of 20 rounds (one bargaining game between one proposer and potentially two responders constituted a round). Participants remained in their pre-assigned roles and were randomly rematched after each round. We employed a 2x2 between-subject design, in which we varied whether the first responder was assigned the ROFR or not, and whether the proposer made a take-it-or-leave-it offer to the responder(s) (*traditional ultimatum game* condition) or was allowed to make multiple but increasing offers (*reverse ultimatum game* condition) to the responder(s), see Table I.

	Traditional UG (UG)	**Reverse UG (RUG)**

Without ROFR	5 cohorts (of 9 subjects)	5 cohorts (of 9 subjects)
With ROFR	5 cohorts (of 9 subjects)	5 cohorts (of 9 subjects)

Table I: 2x2 between-subject design

In each experimental session either one or two cohorts consisting of nine subjects each (three proposers, three first responders and three second responders) participated in one of the experimental conditions.[12] Participants were randomly assigned to the roles of proposer, first and second responder.[13]

4. Experimental Results

Figure 1 plots average payoffs (including disagreements) over time for the proposer in the two different ultimatum games, with and without the ROFR. As in most ultimatum bargaining experiments, outcomes do not cluster near the extreme perfect equilibrium predictions, but rather are in the interior of the payoff space.

[12] While the random rematching was only done within a cohort of nine participants, subjects were not given any identification numbers, so no subject could be recognized as having been part of a particular interaction. Therefore, even though participants were matched with one another more than just once, there was no room for individual reputation building (although the repeated play aspect of the game could in principle give rise to different early-period behavior).

[13] Dividers separated the participants, who could not communicate except via the play of the game. Once seated, participants received written instructions (available from the first author upon request), which were also read aloud by the experiment administrator. All experimental sessions were conducted at the experimental laboratory at Harvard Business School. Participants were Greater Boston residents. The vast majority were undergraduate students from Boston University, Harvard and MIT. An experimental session lasted for about one hour with average earnings of $19 (including a $10 show-up fee and a potential early arrival premium of $5), reflecting the fact that in every game at least one of the two responders earned zero.

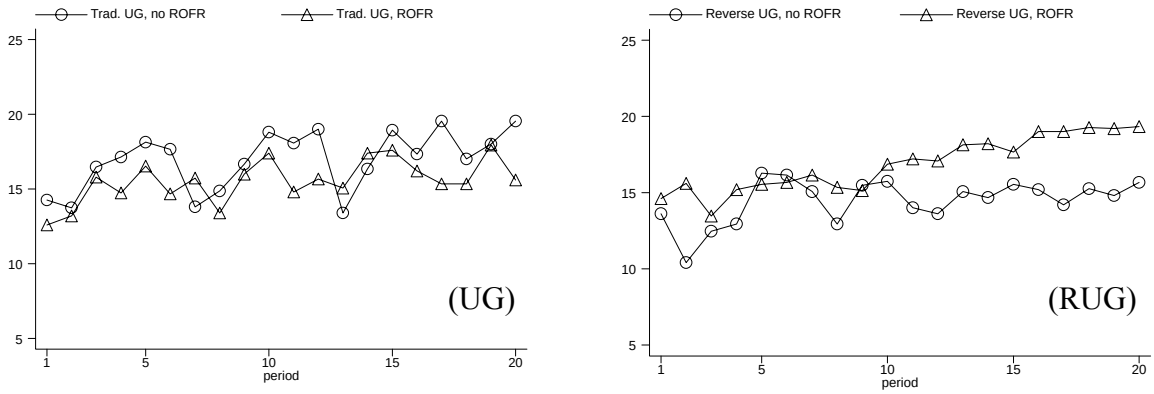

Figure 1: Average payoff of proposers over time (including disagreements), with and without the ROFR, in the traditional ultimatum game (UG), and the reverse ultimatum game (RUG)

In both the ultimatum game and the reverse ultimatum game, the first period earnings of the proposer do not differ according to whether the ROFR was implemented or not (12.6 [SD = 7.02] vs. 14.27 [SD = 6.08] in the first period of the traditional UG, *n.s.*, and 13.6 [SD = 5.50] vs. 14.6 [SD = 4.70] in the first period of the reverse UG, *n.s.*, Kolmogorof-Smirnov test).[14] It is only over time that proposers in the reverse UG are better off when the first responder was assigned the right of first refusal. Testing payoffs in the 20th period shows a significant difference (19.33 [SD = 3.12] vs. 15.67 [SD = 3.09] p=0.004, Kolmogorof-Smirnov test) for the reverse UG but no significant difference for the traditional UG (15.6 [SD = 8.23] vs. 19.53 [SD = 1.96], *n.s.*, Kolmogorof-Smirnov test).[15,16,17]

Figure 2 shows that the difference in the reverse UG is reflected in the *lower earnings of the first responder when he is assigned the right*. Testing for differences in

[14] We also do robust rank order tests of the session-level data. Testing observed medians in the first round of the traditional UG with and without ROFR, the test-statistic is *Ù=1.905*, *ns.* For the reverse UG we get, *Ù=-0.088*, *ns*.

[15] The reason for this insignificance is the high variance in the traditional UG without ROFR.

[16] The rank order statistics are, traditional UG: *Ù=0.781, ns;* reverse UG: *Ù=-12.72, p<0.01.*

[17] To pin down the exact effect of the ROFR, we ran random effects censored Tobit regressions. For the specification and the exact estimation results please consult Appendix A1, Table III. There is no initial difference regarding the effect of the ROFR within each type of UG, i.e., the dummy for the ROFR is not significantly different from zero. Proposers' payoffs are increasing over time in both types of ultimatum games. This is in line with other studies that study ultimatum games with more than one responder (e.g., Grosskopf, 2003). However, proposers' profits increase significantly more over time when the ROFR is implemented, i.e., the interaction term *Period*ROFR* is significantly different from zero in the reverse ultimatum game but not in the traditional ultimatum game. This indicates that the strategic use of the ROFR has to be learned over time and is not immediately apparent to the participants in our experiment.

the distribution of payoffs for the first responder in the reverse UG we find that in the first period there is no significant difference with respect to having the ROFR or not in the reverse UG (7 [SD = 7.13] vs. 7.07 [SD = 6.16], *n.s.*, Kolmogorof-Smirnov test). The difference is significant in period 20 (4.4 [SD = 3.98] vs. 8.67 [SD = 3.90], $p<0.01$, Kolmogorof-Smirnov test).[18]

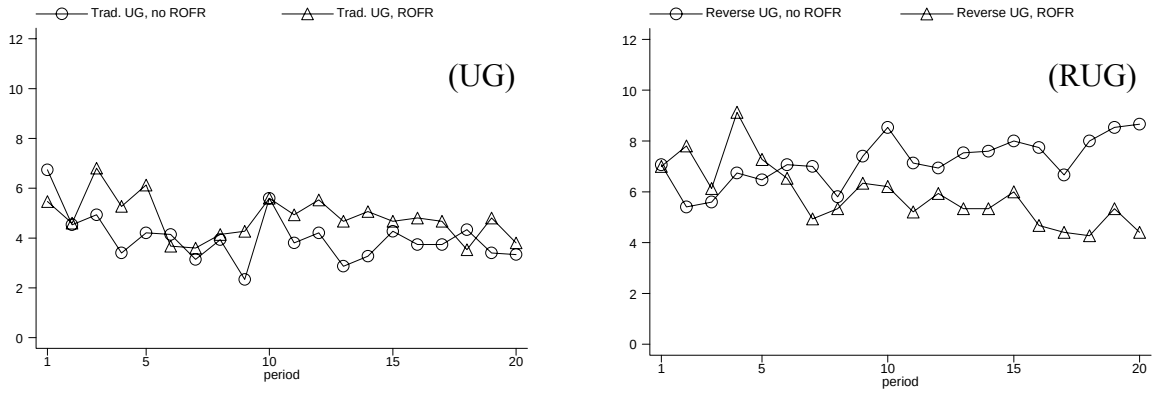

Figure 2: Average payoffs of the first responder over time (including disagreements), in the traditional UG (UG) and the reverse UG (RUG)

Figure 3 plots the average payoffs of the second responders over time in the two ultimatum games. Clearly, being the second responder is never desirable. Moreover, there is no difference in average payoffs to second responders due to the type of ultimatum game and whether the ROFR was granted.[19] However, the low overall payoffs to the second responder reflect the fact that he earns zero in the majority of games, when he does not even get to play. As we can see from the dotplots in Figure 4, when the second responder *does* get to play in the reverse ultimatum game, he sometimes ends up with a big share of the pie in the absence of the ROFR, as suggested by the theoretical predictions for the subgame.[20]

[18] The robust rank order statistics using the session-level data are: Traditional UG: $\dot{U}=0.211$, *n.s.* (1st period); $\dot{U}=-0.609$, *n.s.* (20th period); Reverse UG: $\dot{U}=0.098$, *ns* (1st period); $\dot{U}=5.493$, $p<0.05$ (20th period).

[19] The robust rank order statistics using the session-level data are: Traditional UG: $\dot{U}=0$, *ns* (1st period); $\dot{U}=-1.400$, *n.s.* (20th period); Reverse UG: $\dot{U}=-1.170$, *n.s.* (1st period); $\dot{U}=-0.988$, $p<0.05$ (20th period).

[20] The dotplots plot a circle for each individual payoff. Disagreements or non-participation of the second responder result in a zero payoff.

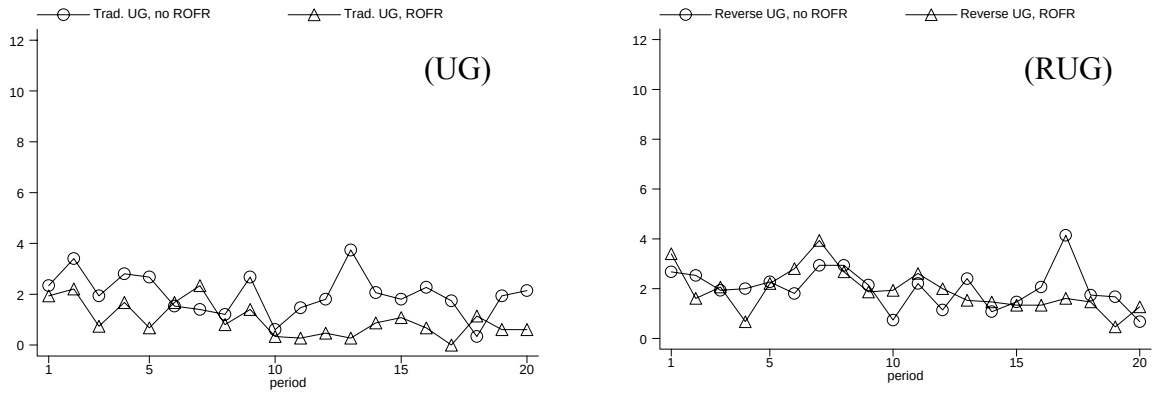

Figure 3: Average payoffs of the second responder over time, (including disagreements) in the traditional UG (UG) and the reverse UG (RUG)

We see that 21 times (out of 69 times when he got to play) in the reverse UG without the ROFR the second responder received more than 50% of the pie, as indicated by the dots above the horizontal line. There is not a single case of a second responder receiving more than 50% of the pie in the reverse UG *with* the ROFR, even though the second responder got to play significantly more often in the reverse UG with the ROFR (38.67% vs. 23%).

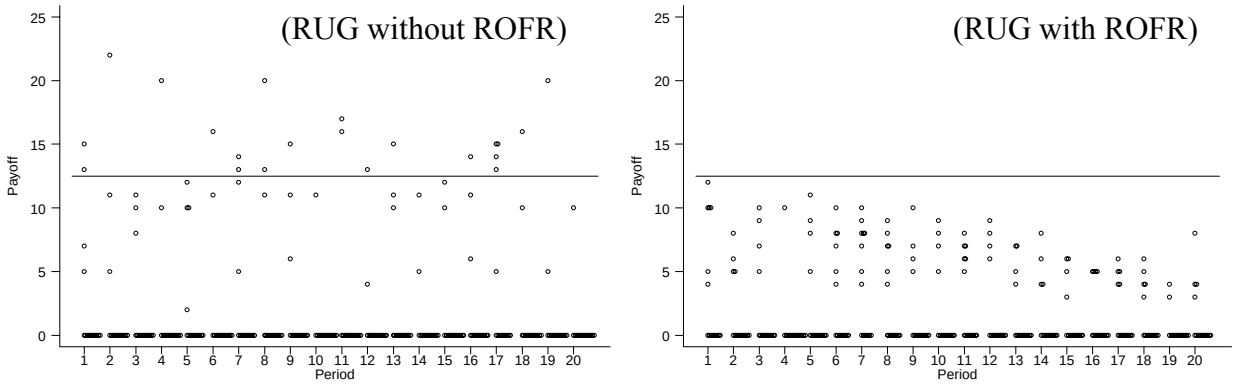

Figure 4: Dotplots of payoffs of second responders in the reverse UG

In the traditional UG, in contrast, Figure 5 shows that there is no difference in the payoff of the second responder with respect to the presence of the ROFR. The second responder never receives more than 50% of the pie in either condition.

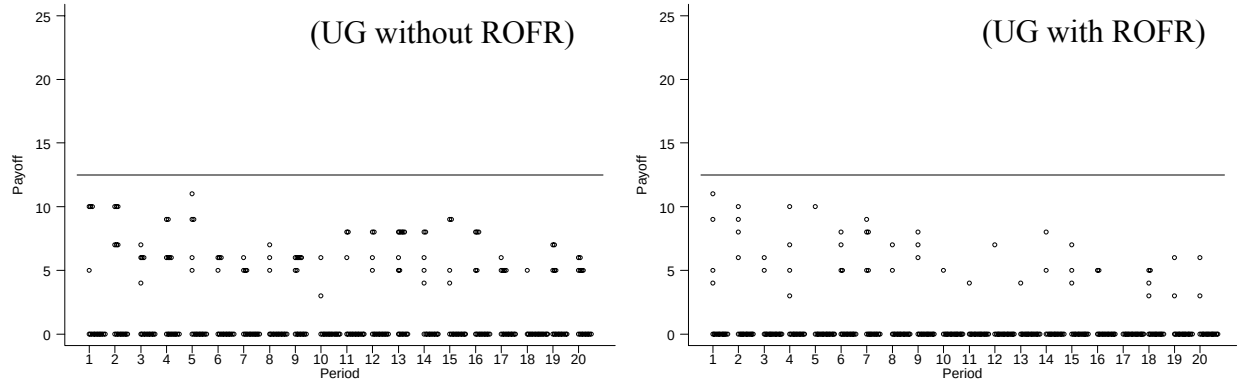

Figure 5: Dotplots of payoffs of second responders in the traditional UG

Figures 6 and 7 show how proposers incorporated their experience with second responders into their (final) offers to first responders. Conditional on the second responder getting to play, the figures plot the first responder's last rejected offer (*R1*) before the proposer switched to the second responder.[21]

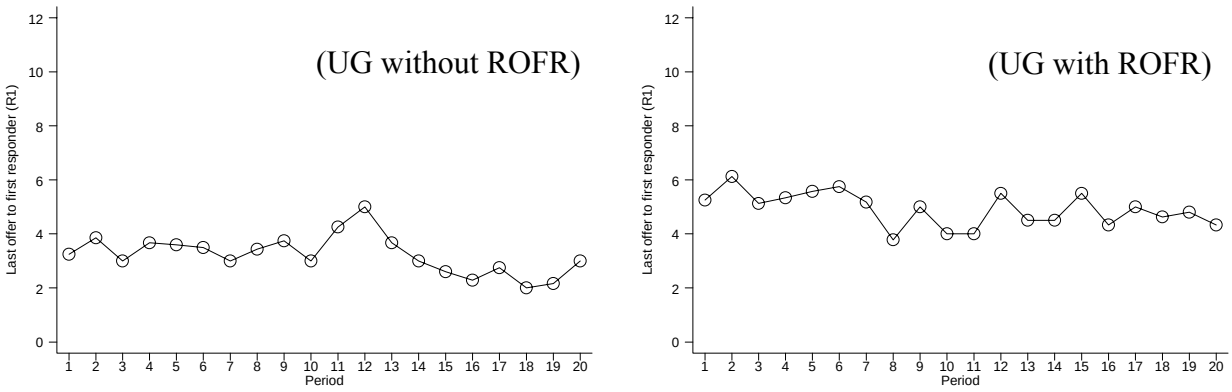

Figure 6: First responders' average rejected offer *(R1)* before proposer made a new offer to the second responder in the traditional UG

In the traditional ultimatum games, the introduction of the ROFR has little effect on the evolution over time of proposers' "walk away" offers, *R1* (see Figure 6). However after the ROFR is introduced in the reverse ultimatum games, the right graph of Figure 7 shows that proposers become increasingly willing to walk away from the first responder,

[21] Appendix A6 shows that the second responder's participation in the reverse UG with ROFR does not change over time. Proposers in the reverse UG without ROFR on the other hand, switch less to the second responder over time.

and do so at steadily lower final offers. This indicates that proposers learn the strategic use of the ROFR, i.e., over time proposers realize that it is in their power to decrease *R1* because the ROFR of the first responder increases their bargaining power with the second responder.

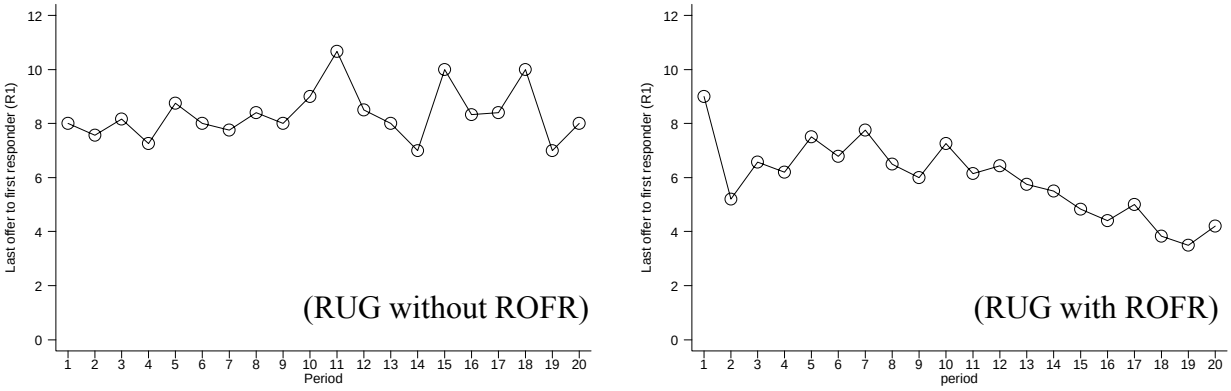

Figure 7: First responders' average last rejected offer *(R1)* before proposer decided to switch to second responder in the reverse UG

Table II looks at the strategic aspects of this decision more closely, by tabulating the offers made to the second responder as a function of the final offer, *R1*, made to the first responder. For each of the experimental conditions, Table II shows how the final offers accepted or rejected by the second responder compare to the final offer rejected by the first responder. This table makes clear that, in both the ultimatum game and the reverse ultimatum game, giving the first responder a ROFR induces the proposer to make fewer offers to the second responder that are more generous than his final offer to the first responder. That is, when there is no ROFR, the majority of (final) offers to second responders are more generous than the last offers made to first responders. But when the first responder has a ROFR, such offers would trigger his right. Hence, the *first* responder's ROFR strengthens the *proposer's* bargaining position with respect to the *second* responder, and Table II allows us to see how this plays out.[22]

[22] Note that the data shown in Table II refer to accumulated counts over all rounds and all sessions. These data are therefore not independent. We chose to report them here to better illustrate the dynamics of the bargaining process. We do not conduct any tests on these data. All statistical tests done in this paper are on independent observations, either session level data or clustered individual data.

	Traditional UG					Reverse UG				
	2nd got to play		#	accepted	rejected	2nd got to play		#	accepted	rejected**
No ROFR	38% (114/300)	< *R1*	0.01% (1/114)	100% (1/1)	0	23% (69/300)	< *R1*	5.80% (4/69)	100% (4/4)	0
		= *R1*	18.42% (21/114)	76.19% (16/21)	23.81% (5/21)		= *R1*	4.35% (3/69)	66.67% (2/3)	33.33% (1/3)
		> *R1*	**80.70%** (92/114)	80.43% (74/92)	19.57% (18/92)		> *R1*	**89.86%** (62/69)	75.81% (47/62)	24.19% (15/62)
ROFR	47.33% (142/300)	< *R1*	6.34% (9/142)	66.67% (6/9)	33.33% (3/9)	38.67% (116/300)	< *R1*	4.31% (5/116)	100% (5/5)	0
		= *R1*	36.62% (52/142)	80.77% (42/52)	19.23% (10/52)		= *R1*	**68.97%** (80/116)	100% (80/80)	0
		> *R1*	57.04%* (81/142)	61.73% (50/81)	38.27% (31/81)		> *R1*	26.72%* (31/116)‡	74.19% (23/31)	25.81% (8/31)

Note: *In all of those cases the ROFR was invoked and the first responder accepted the offer.
**Since the table lists *final* offers, the proposer decided to end the bargaining after each rejection tabulated here.
‡ 21 out of those 31 times a second responder had been offered an amount equal to *R1* before being offered more.

Table II: Observed frequencies of participation and final offers made to the second responder (*R1* is the last offer rejected by the first responder and is known to the second responder. # indicates the proportion of accepted or rejected final offers to the second responder that are smaller, equal or greater than *R1*)

The second responder gets to play less often in the reverse ultimatum game without ROFR, 23%, than in the traditional ultimatum game without ROFR, 38%. In both ultimatum games without ROFR, the second responder then leaves the negotiation with a bigger share than that originally rejected by the first responder, 80.70% of the time in the traditional UG and 89.86% in the reverse UG.[23] In the traditional UG this happens because the proposer made a higher take-it-or-leave-it offer to the second responder. This higher take-it-or-leave-it offer might have been induced by the belief that the rejection of the first responder is somehow representative of the responder population, and offering more to the second responder might increase the expected profit of the proposer by decreasing the likelihood of a rejection. In the reverse UG this happens because the second responder often rejects small offers (recall that second responders know *R1*) and essentially presents the proposer with an ultimatum. In 24.19% of those

[23] As we have mentioned before, in 21 out of 69 of those cases, the second responder does not only get more than what was previously rejected by the first responder, but he gets more than half of the entire available pie (see the left graph in Figure 4).

cases the proposer decides to end the negotiation, rather than give the second responder a still bigger share.

When the ROFR is introduced, the second responder gets to play slightly more often in the traditional UG, 47.33%, than in the reverse UG, 38.67%. In both types of ultimatum game this observed participation of the second responder is higher when the ROFR is implemented compared to the situation when it is not (47.33% vs. 38% in the traditional UG, and 38.67% vs. 23% in the reverse UG). However, the observed frequency of the second responder getting a more favorable outcome than the one rejected by the first responder is smaller when the ROFR is implemented. In the traditional UG with ROFR, the second responder got a more generous offer only 81 times out of 142 (57.04%), compared to 92 out of 114 (80.70%) in the traditional UG without ROFR. In the reverse UG, this difference is more pronounced. The second responder received a more favorable offer than *R1* in the reverse UG with the ROFR only 31 out of 116 times (26.72%), compared to 62 out of 69 times (89.86%) without the ROFR. Interestingly, out of the 31 "final" offers that end up being greater than *R1*, only 10 times did the second responder not even get the chance to accept an offer equal to *R1*. In all other 21 cases the second responder had been offered an amount equal to *R1* before being offered more. It is clear that letting the proposer offer more than *R1* is a mistake by the second responder since once it was evoked, the first responder always exercised his right of first refusal.

Note also that 89.86% of final offers to the second responder are higher than *R1* in the reverse UG without the ROFR, but more than 2/3 of all final offers in the reverse UG *with* the ROFR are exactly *at R1*, the "exercise point" of the ROFR. Thus in the subgame in which the second responder gets to play, we see behavior that conforms closely to the perfect equilibrium prediction.

In light of these data, which clearly show that the before and after ROFR is disadvantageous to its holder in the reverse ultimatum game, we can ask why it was not equally disadvantageous in the traditional ultimatum game? The perfect equilibrium prediction that the right will have no effect in the traditional ultimatum game rested on the prediction that the first responder would already be doing as badly as possible even without the right. However in the experimental environment, first responders make

positive profits in the ultimatum game without ROFR, comparable to those they make in the reverse ultimatum game without ROFR. What then accounts for the lack of effect when the ROFR is introduced in the traditional ultimatum game?

One possibility is that effective strategic behavior has to be learned, and that the ultimatum game, with its single offers, gives players fewer opportunities to get appropriate feedback than does the multi-offer reverse ultimatum game (just as players learn more slowly in sealed bid than in ascending auctions, see Ariely, Ockenfels and Roth, forthcoming). In the reverse ultimatum game, an offer below *R1* to the second responder that is rejected can be increased in a subsequent offer, and these are most often accepted when they reach *R1*, i.e., just before they activate the ROFR. This is a rational response by the second responder, since all the offers we observed over *R1*, i.e. all the offers that triggered the ROFR, were actually accepted by the first responder, leaving the second responder with zero. So, in the reverse ultimatum game, a responder who has learned from experience not to activate the ROFR can earn *R1* even if the proposer has not yet figured out how the ROFR works. And so, in turn, a proposer in the reverse ultimatum game gets feedback that allows him to understand how the ROFR, and the final offer *R1*, affect the bargaining with the second responder. In contrast, in the ultimatum game, proposers do not have this luxury, and neither can second responders assure themselves of a profit even if they understand that once activated the ROFR will be exercised.

Another possibility is that subjects' preferences for fairness, or for not being treated unfairly, (as in Bolton and Ockenfels, 2000, or Fehr and Schmidt, 1999), simply change the minimal acceptable responder payoff without changing the effect of the ROFR. In this view, proposers are in fact doing about as well as they can in the ultimatum game even though responders are receiving a substantial share of the profits. The fact that observed agreements change over time could then be consistent with fully rational learning about the reservation price of the responders, or with less than fully rational learning of the kind studied e.g. in Roth and Erev (1995) and Erev and Roth (1998).

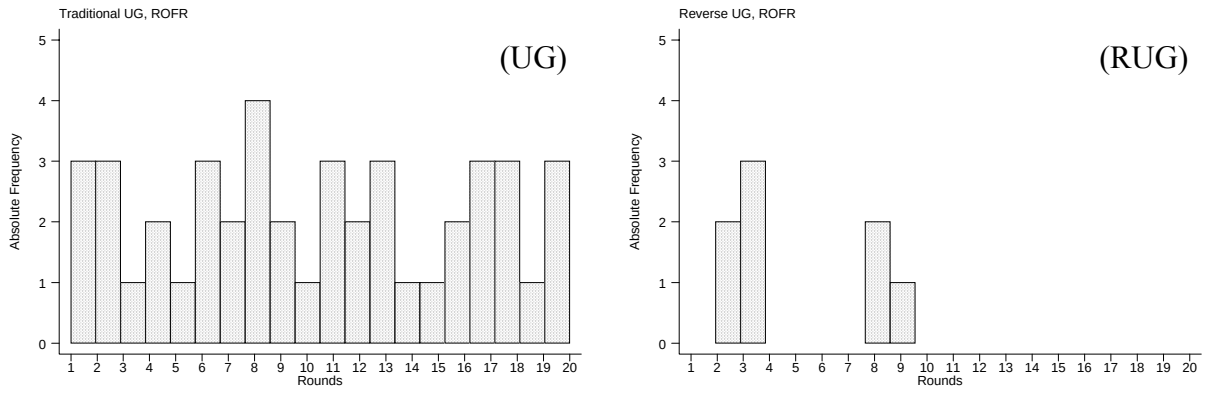

Figure 8: Histogram of disagreements in the UGs with ROFR over time

The left graph of Figure 8 shows that rejections persist over time in the ultimatum game, which is not the case in the reverse ultimatum game (see the right graph of Figure 8).[24]

Thus, while the experimental results differ from the perfect equilibrium predictions, the effect of the before and after ROFR that we observe in the experiments is precisely as predicted, it hurts the holder of the right in the reverse ultimatum game (in which he is predicted to do well without the right) and it does not help him in the ultimatum game (in which he is predicted to do poorly without the right).

5. Efficiency

So far, to make clear how the before and after right of first refusal can hurt the right holder, we have concentrated on a simple environment in which all agreements are efficient. We now consider the case in which the first responder (the right holder) and the second responder (the third party) can have different values for the asset (both higher than the seller's value). Then efficiency requires that the asset be sold to the buyer with the higher value. But if the bargaining is conducted as in the reverse ultimatum game, then the seller will only receive the lowest feasible price regardless of to whom he sells, and so he is indifferent to whom he sells, i.e., he has no preference to transact with the high value buyer. When the right holder has a BA-ROFR, however, the seller will be able to extract the entire value of the lower valued buyer, by transacting efficiently with

[24] See Appendix A7 for a more thorough analysis of the disagreement behavior.

the high value buyer. Thus the harm that the BA-ROFR does to the right holder does not come at the expense of efficiency.

Note that we will be showing that, in the bargaining environments we consider here, the BA-ROFR has exactly the opposite properties that the right to move last and replace the winning bidder has in a second price auction (L-ROFR). Whereas that kind of L-ROFR helps the right holder but reduces efficiency, here the BA-ROFR hurts the right holder but promotes efficiency.[25]

To concentrate on the effect of the right of first refusal in the starkest case, we assume the values of the buyers are common knowledge. Let X be the first responder's valuation of the asset, and Y be the valuation of the second responder. The reverse ultimatum game in this (variable value) environment can be described as follows: the proposer first asks for a price to be paid by the first responder. If the first responder rejects that price, the proposer can revise his asking price (decrease it by at least one token) or switch to the second responder. The proposer can ask for a new initial price to be paid by the second responder. If the second responder rejects that price, the proposer can decrease his asking price by at least one token or decide to end the bargaining altogether, in which case all players receive a payoff of zero.

Reverse UG without ROFR:

Lemma 1*: Independently of the size of X and Y, there exist multiple subgame perfect equilibrium payoffs of the one-proposer two-responder reverse ultimatum game without ROFR. In particular, when $X<Y$ there exist inefficient equilibrium outcomes, in which the first responder is awarded the object and agrees to pay any price p, with $0 < p < X$.*

[25] So one can imagine an environment in which all parties understand that the right of first refusal formulated in this way is disadvantageous to the right holder, but that in the other terms of the contract the right holder is compensated for this, out of the anticipated efficiency gains that result.

Main element of the proof: The proof follows our earlier discussion of multiple equilibria, with the driving force behind the multiplicity being the indifference of the proposer between reaching an agreement of *(1,X-1,0)* with the first responder or *(1,0,Y-1)* with the second responder.

Because this multiplicity of equilbria is driven by the proposer's indifference between paths of play at which he receives the minimum feasible price, if we perturb the minimum price that can be feasibly offered to one of the buyers, we can get a unique subgame perfect equilibrium in a way that is independent of efficiency considerations. For example, consider a perturbed reverse ultimatum game in which the minimum price that can be asked of the first responder is $p=2$, while the minimum price that can be asked of the second responder remains $p=1$. This will induce the proposer to trade with the first responder at any subgame perfect equilibrium, regardless of whether this is efficient. That is, we have the following corollary.

Corollary: *In the perturbed RUG without ROFR, independently of the size of X and Y, the unique subgame perfect equilibrium outcome is that the first responder always receives the asset and pays p=2. When X<Y, this unique equilibrium outcome is inefficient.*

However, the introduction of the BA-ROFR reestablishes efficiency. We have the following results.

Reverse UG with ROFR:

Theorem 3: *At any subgame perfect equilibrium of the reverse ultimatum game with BA-ROFR, the responder with the higher valuation will buy the object.* ***A)*** *If X<Y, there are two subgame perfect equilibrium prices, one in which the price is X+1 and one in which the price is X.* ***B)*** *If X>Y, then the two subgame perfect equilibrium prices are Y and Y-1.*

Sketch of the proof: ***A)*** In the subgame with the second responder, after an offer of a price $p=X+1$ to the first responder has been made and rejected, the proposer asks for $X+1$, i.e., offers $Y-(X+1)$ to the second responder, who accepts if he believes that the first responder would agree to pay a price of X. Since the first responder is indifferent between paying a price of X and not getting the object at all, we have another equilibrium in which the second responder thinks that the first will not accept a price of X and therefore is only willing to pay X himself. Therefore, the second responder who values the good more, always gets the object and pays a price just above the first responder's valuation or at the first responder's valuation. Note that, while the BA-ROFR reestablishes efficiency, it clearly hurts the right holder in this case since he never earns positive profits (in contrast to the game without a right of first refusal). ***B)*** If the valuation of the right holder is higher than that of the potential outside buyer, the proposer would ask for a price of Y from the first responder, who accepts, since otherwise the proposer would ask for Y from the second responder who is indifferent between accepting that price and refusing it. The second responder's willingness to pay Y supports an equilibrium price of Y. An equilibrium price of $Y-1$ is supported by the second responder rejecting Y but accepting a price of $Y-1$. We therefore again have two equilibria, and both are efficient.

6. Discussion

Many economic transactions are regulated by contract, and because of the incompleteness of contracts, clauses such as rights of first refusal are intended to give one of the parties the security needed to justify fixed investment that will be lost if, at the conclusion of the contract, the asset is transferred to a third party.[26] However, "before and after" rights of first refusal, found in entertainment and real estate, can work to the disadvantage of the right holder. Because they require the right holder to exercise the right *before* a third party for some offers, while retaining the right to take better offers *after* they have been proposed to the third party, they permit the asset owner to present the third party with an ultimatum, in a way that gives the asset owner an advantage, and

the right holder a disadvantage, compared to the case when negotiations are conducted without such a right.

Because the entertainment contracts and rental legislation that motivate this study describe the form of the right of first refusal in detail, but are silent on other aspects of negotiation, we study the effect of the right in two, quite different negotiation environments, the traditional ultimatum game and the reverse ultimatum game. This allows us to see the effect of the right, and understand how it interacts with other aspects of negotiation, more clearly than if we confined our attention to a single negotiating environment.[27] This may be an approach that will be useful more generally in analyzing aspects of contract design, since contracts are necessarily incomplete on many issues that may interact with the design features being studied.

We chose to study this contract form theoretically and experimentally for several reasons. First, field data on performance of contracts of this type are sparse and incomplete, not only in equilibrium (at which it is predicted that the ROFR is never activated), but also in practice.[28] And a theoretical demonstration alone would not be persuasive if it depended on the accuracy of perfect equilibrium as a point predictor, since perfect equilibrium is a notoriously bad point predictor for games of this sort. But theory and experiments are complements here, to each other, and to the sparse information from the field. Together they allow us to look inside the legal terms of a contract, and examine its effects on the parties. As in other areas of economic design, the details matter.[29] In this case, simple theory suggests, and experiments confirm, that the sequencing of events in this "before and after" right of first refusal can cause it to work to the disadvantage of the right holder.

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[26] See Kahn (1999) and Walker (1999) for analyses of other varieties of ROFR than those considered here.

[27] And, of course, rights may interact differently with different rules of bargaining.

[28] In the negotiations over *Frasier,* Paramount and NBC remained at the bargaining table after the deadline had expired and finally agreed on a price, without a formal "Last Offer" ever being issued (see Subramanian, 2001b). However non-incumbent networks occasionally do enter the negotiations, and some shows do change networks. For example, *Sabrina, the Teenage Witch* moved from ABC to WB in fall 2000 and *Buffy, the Vampire Slayer* switched from Warner Brothers (WB) to United Paramount Networks (UPN) in February 2001. Susan Laury alerted us to the latter example.

[29] Most experimental work so far in economic design has concerned market design (see e.g. Kagel and Roth 2000; Roth, 2002; Wilson, 2002; Milgrom, 2004), and much less has concerned contract design. But see Grether and Plott (1984) for a notable early exception (and related work by Holt and Scheffman, 1987, and Schnitzer, 1994 showing that advance price notices in combination with other contract clauses can be anticompetitive, although they appear to be designed to protect the consumer).

The question remains of why the BA-ROFR was implemented in the first place. One may argue that the BA-ROFR is only one part of a more complex contract, and other factors from which we have abstracted might mitigate the effect of the BA-ROFR. However, despite the efficiency enhancing properties, it seems likely that, in the entertainment industry and in the rental legislation in England and Wales, this form of right of first refusal was implemented by mistake, at least on the part of some of the parties, and has not "strengthened the rights of the leaseholders" as was intended by the legislators. Bad contract clauses can perhaps survive because of slow learning in bargaining games of this sort (see for example, Roth and Erev 1995), and because the players who do get the most opportunity to learn from repeated play, such as large landlords, may profit from this kind of right being given to tenants.[30]

Because contracts are renewed only episodically, and because individual contract clauses may be activated even more rarely, contracts may be under less "evolutionary pressure" than market rules, making it more likely that conventional contracts may contain hidden effects of the kind discussed here. It therefore seems likely that careful economic analysis at a detailed level may have as much to offer in the design and redesign of contracts as in the design and refinement of markets.

[30] Bad clauses may also be "bundled" with good ones. For example, while the right of first refusal contained in paragraphs 2 and 3 of the letter from NBC to Paramount may put NBC at a disadvantage in the subsequent bargaining, the specification in paragraph 1 that the bargaining will not begin until February 2001, may have protected NBC from bearing efficiency losses from having to negotiate the contract renewal much further in advance of its expiration date. This kind of "unraveling" is common in many two-sided matching transactions (see e.g. Roth, 1984; Roth and Xing, 1994; Avery *et al.* 2001, Niederle and Roth, 2003, 2004, McKinney, Niederle, and Roth 2005.)

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Appendix A[31]

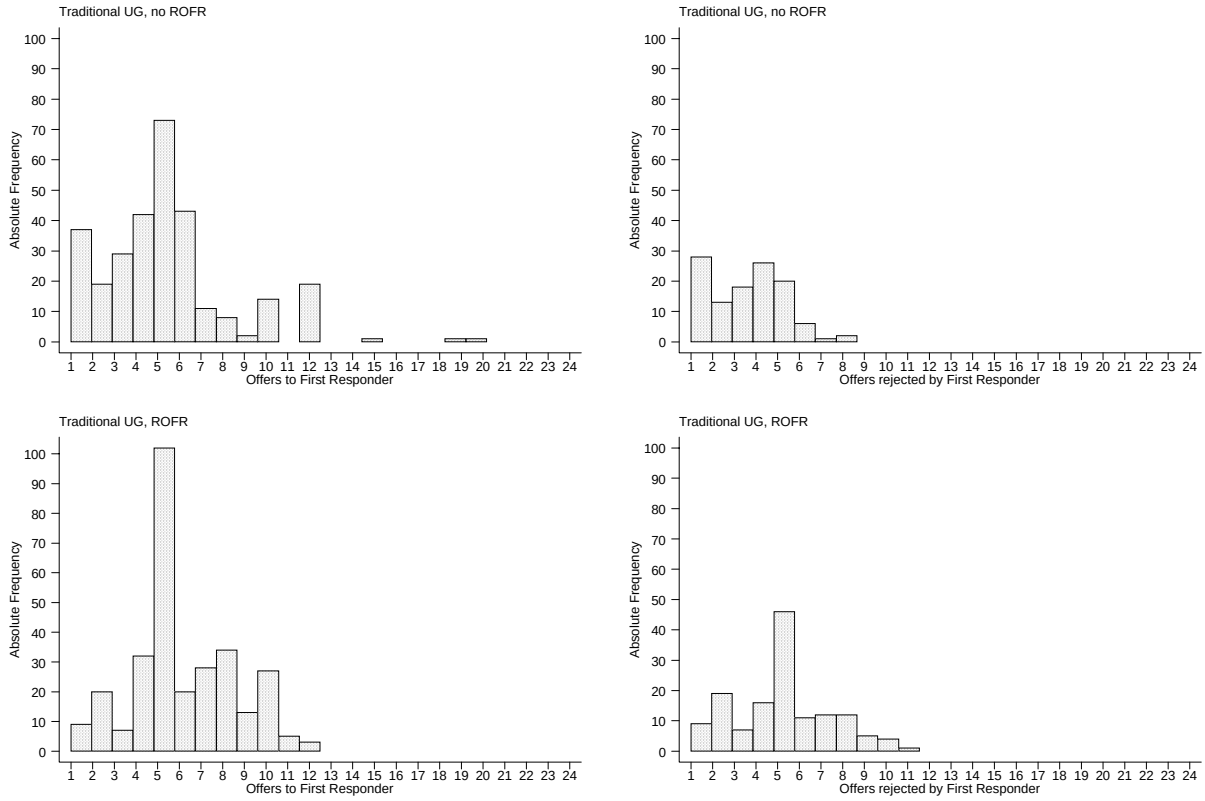
A1. Proposers' Payoff over Time

We run random effects censored Tobit regressions where the lower limit is 0 and the upper limit is 24 (the maximum amount a proposer could potentially receive), separately for each type of ultimatum game, in which we regressed the profit of the proposer (*profit)* on a time trend (*period),* a dummy representing whether the ROFR (*ROFR*) was implemented or not and an interaction term between the periods and the ROFR (*Period*ROFR*). Table III shows the main results.

	Traditional UG		**Reverse UG**	
	Coefficients	$p > \|z\|$	Coefficients	$p > \|z\|$
Period	**0.187** (0.0712)	**0.009**	**0.127** (0.0451)	**0.005**
ROFR	-1.112 (1.2083)	0.357	0.808 (0.7640)	0.290
*Period*ROFR*	-0.051 (0.1008)	0.615	**0.159** (0.0637)	**0.012**
Constant	**14.856** (0.8530)	**0.000**	**12.987** (0.6173)	**0.000**
Log Likelihood	-1877.8374		-1732.2044	

Table III: Results of the random effects censored Tobit regressions
(Standard errors are given in parentheses, numbers in bold indicate significance at $p<0.05$).

A2. Behavior of First Responder (Traditional UG)



[31] The full data set is available upon request from the first author.

Figure 9: Offers made to the first responder (left) and offers rejected (right) in the Traditional UG without (top) and with (bottom) ROFR

A3. Behavior of Second Responder (Traditional UG)

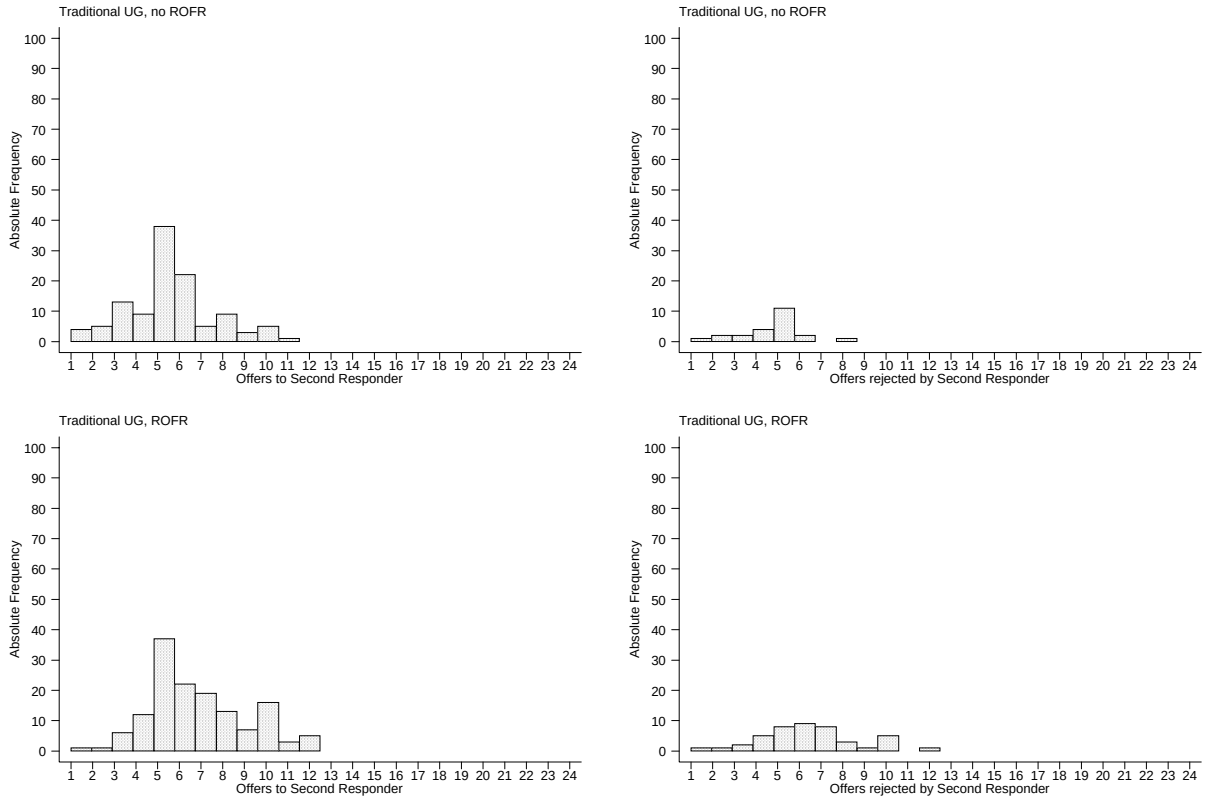
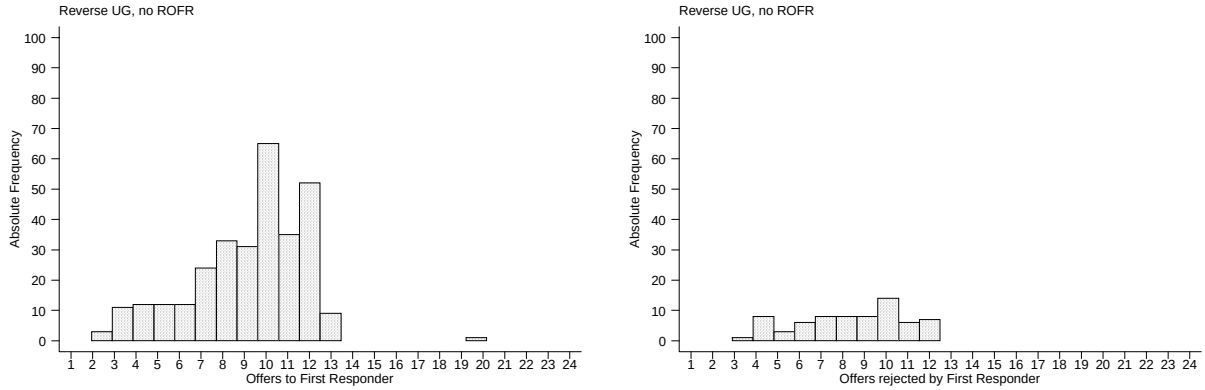


Figure 10: Offers made to the second responder (left) and offers rejected (right) in the Traditional UG without (top) and with (bottom) ROFR

A4. Behavior of First Responder (Reverse UG)



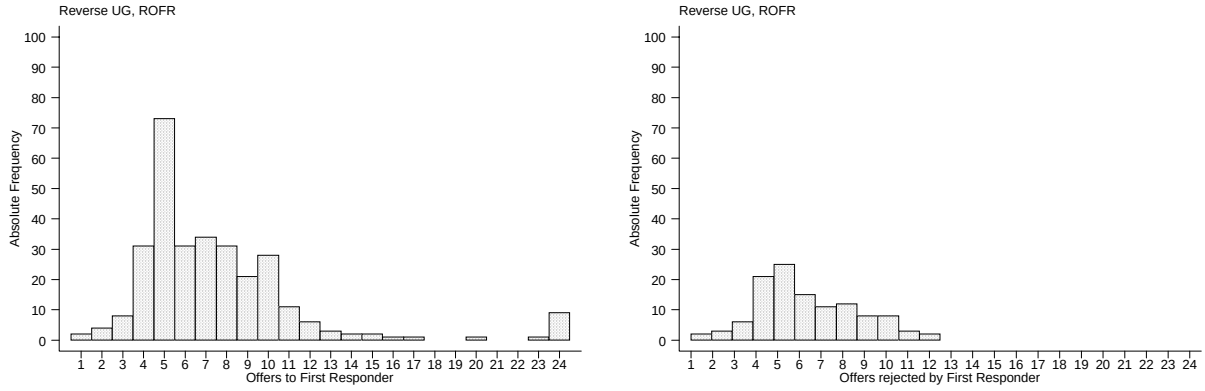


Figure 11: Offers made to the first responder (left) and offers rejected (right) in the Reverse UG without (top) and with (bottom) ROFR

A5. Behavior of Second Responder (Reverse UG)

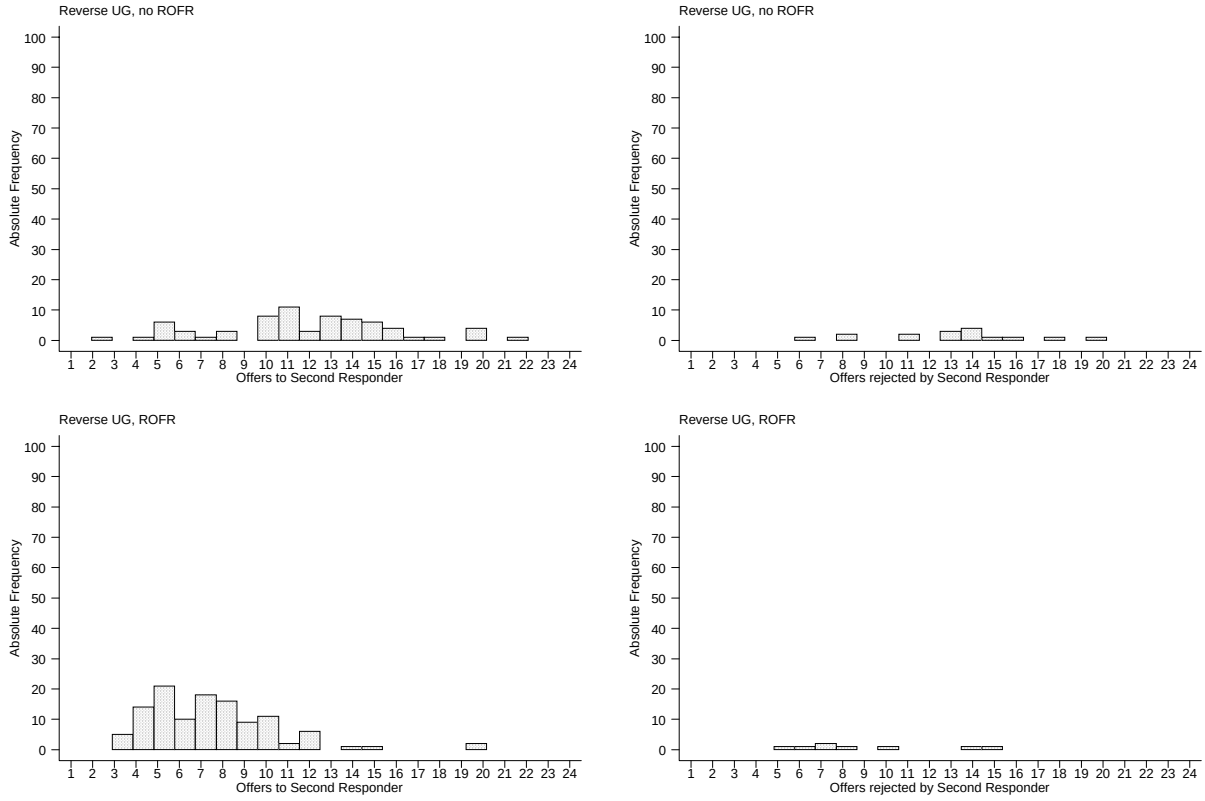


Figure 12: Offers made to the second responder (left) and offers rejected (right) in the Traditional UG without (top) and with (bottom) ROFR

A6. Participation of Second Responder

Figure 13 (A) shows that, after the initial periods, a second responder in the traditional UG gets to play roughly 40% of the time. Figure 13 (B) shows that the second responder gets to play less frequently over time in the reverse UG without the ROFR. The introduction of the ROFR changes the picture: the participation of the second responder remains roughly constant at 40% throughout.

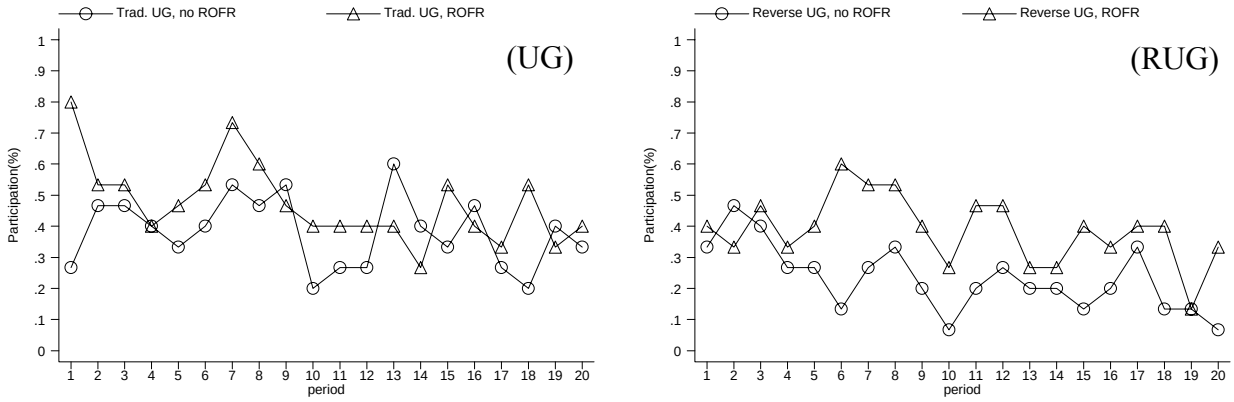


Figure 13: Observed frequency of participation of the second responder over time

A7. Disagreement Behavior

The number of disagreements in the reverse UG is significantly less than in the traditional UG (24 versus 67, $\dot{U}$=2.14, p<0.05. robust rank order on session level data).[32] In the traditional UG these disagreements result from rejections of the "take-it-or-leave-it" offers made to the second responder. In the reverse UG these disagreements are the result of the proposer choosing to end the bargaining. There are seemingly less rejections in the traditional UG without the ROFR (23) than in the traditional UG with the ROFR (44), but this difference is not significant ($\dot{U}$=*-0.92*, *n.s.*, robust rank order on session level data). The reverse holds true for the reverse UG. Proposers decided to end the bargaining in 16 (5.33%) out of the 300 observations without the ROFR, and only 8 (2.67%) out of 300 when the ROFR was implemented, $\dot{U}$=*3.24*, p<0.025, robust rank order on session level data. Given our fixed-pie setup, we can analyze efficiency regarding the occurrences of disagreements. It seems as if the introduction of the ROFR enhances efficiency in the reverse UG, but decreases efficiency in the traditional UG.

We see from the left graph of Figure 14 that disagreements in the traditional UG without ROFR occur throughout the entire duration of the experiment. However, the right graph of Figure 14 shows that disagreements in the reverse UG without the ROFR are more common in earlier than in later rounds.

[32] Again, please note that we are aggregating over all rounds within one session. The numbers of rejections given are total rejections from all session within one treatment but robust rank order tests are done on session level data only.

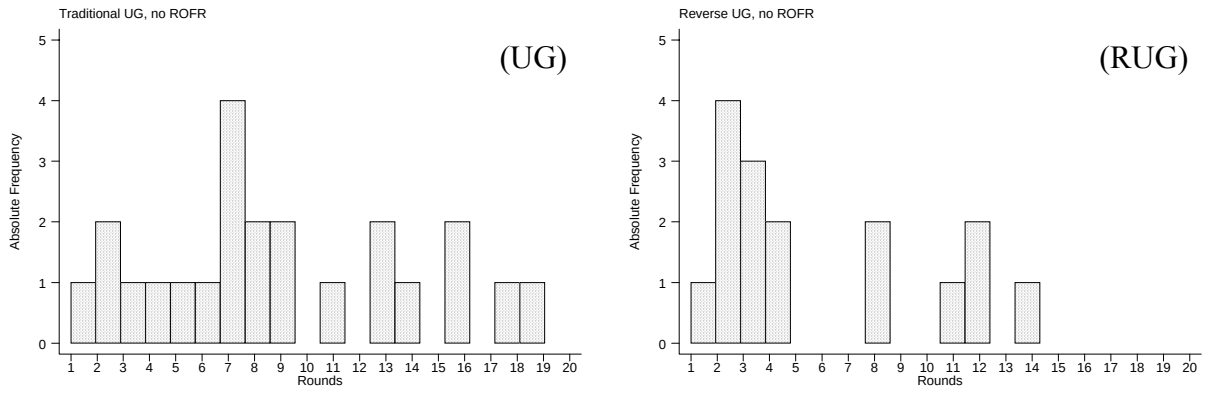


Figure 14: Histogram of disagreements for the UGs without ROFR over time

On the Right-of-first-refusal*

by
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Abstract

When the seller of an asset grants a right-of-first-refusal to a buyer, this special buyer has the opportunity to purchase the asset at the best price the seller can obtain from the other potential buyers. We show that the right-of-first-refusal is inefficient, and it benefits the special buyer at the expense of the seller and other buyers. In a private values model, the benefit the special buyer obtains via the right-of-first-refusal equals the cost to the seller. When buyers' valuations are correlated, the presence of a special buyer exacerbates the winner's curse on regular buyers. Consequently, the special buyer's expected gain from the right-of-first-refusal is often less than the expected loss to the seller. Thus, our analysis suggests that the seller should exercise considerable caution prior to deciding whether to grant this right to a buyer.

JEL Classification Numbers: D4, L11, L14.

Keywords: pricing, contracts, right-of-first-refusal, meet-the-competition clause.

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1 Introduction

New price setting mechanisms come into being to solve extant problems. For example, posted prices became common in the early part of the nineteenth century to solve, in part, the agency problems engendered by the confluence of bargaining and the advent of large corporations and multi-location merchandizing. (See Arnold and Lippman [1998] for a comparison of posted prices and bargaining.) Prompted by advances in technology and the need to serve geographically dispersed bidders, auctions have greatly increased in visibility in the last fifteen years. These three price setting mechanisms are joined by other contracting mechanisms to solve additional problems such as externalities, risk sharing, and the alleviation of market failures. Having come into existence, price setting mechanisms and other economic institutions survive in the long run only if they continue to fulfill some purpose. One such price setting mechanism is the right-of-first-refusal.

But just as there is good taste and bad taste, there are situations which are appropriate and others which are inappropriate for the use of a given price mechanism. The model and analysis of this paper specifies a rather broad set of circumstances in which the right-of-first-refusal should not be granted. Moreover, these circumstances include cases wherein it is not uncommon for the right-of-first-refusal to be granted in today's business world. Thus, our analysis warns and prescribes sellers to exercise extreme caution when considering whether or not to grant a right-of-first-refusal.

This right, awarded by the seller of an asset, grants to a special buyer the ability to purchase the asset in question at the highest price offered to the seller by any other buyer. The practice of granting a right-of-first-refusal is most common in real estate transactions, in the purchase of a partnership interest (by one of the extant partners), in professional sports, and in the right to employ artistic talent in the entertainment industry (books, movies, music). In situations with uncertain profitability (including the the case of artistic talent), the right-of-first-refusal sometimes can be employed to cure market failures (see Concluding Remarks).

The reasons for the granting of such a right-of-first-refusal appear, at first blush, valid. The current tenant would like the opportunity of becoming his own landlord should the current landlord seek to sell the property[1]; the original partners might seek to avoid taking in a new partner and wish the right to purchase the exiting partner's interest at the price to be paid by a potential new partner; and the firm taking the risk on new talent or a new talent-based project seeks to appropriate some, if not all, of the benefits of any spin-off or synergy from such a venture.

Nevertheless, anecdotal evidence suggests that it is not always in the best interests of the seller to grant a right-of-first-refusal [see Bulow (1995) and Brandenburger and Nalebuff (1996)]. In 1994, the Miami Dolphins football team was sold to Wayne Huizenga, the founder of Blockbuster Video, at a price that was thought to be considerably below its valuation. Mr. Huizenga had a right-of-first-refusal on the sale of the

[1]The intent appears to be similar to that of a non-disturbance clause in a lease.

Dolphins. Unfortunately for the owners, the Dolphins' sale attracted only one other buyer who offered a very low price. Mr. Huizenga exercised his right to purchase at that price.

The goal of this paper is to investigate the impact of a right-of-first-refusal on the seller and the potential buyers. All buyers in our model, including the special buyer, have identical probability distributions over their valuations and information. The seller employs a sealed-bid second-price auction to price the asset. The asset is allocated to the highest bidder in the auction, modulo the special buyer's ability to match the allocation price. Our assumption of *ex ante* identical buyers enables us to investigate whether it is profitable for a seller to grant a right-of-first-refusal when faced with buyers who are similar to each other.

We show in Section 3 that a right-of-first-refusal increases the special buyer's expected profit for two reasons. First, the special buyer might purchase the asset even when her valuation for the object is not the highest among all potential buyers. Thus, the outcome under a right-of-first-refusal is inefficient. Second, when buyer valuations are correlated, the right-of-first-refusal exacerbates the winner's curse for the regular (i.e., non-special) buyers, causing them to bid less aggressively, thereby not only reducing their own surpluses but also increasing the inefficiency of the auction.

These facts also imply that the seller places himself in a disadvantageous position by awarding the special buyer this right. Presumably, the special buyer compensates the seller, in some manner, at the time the seller grants the special buyer a right-of-first-refusal. The seller can be adequately compensated only if the sum of the benefits to this pair, seller and special buyer, is positive when the seller grants this right to the special buyer. That is, a right-of-first-refusal should be granted only if the magnitude of the seller's loss due to the right-of-first-refusal is less than the special buyer's gain. In Section 4, we investigate whether the seller and special buyer can mutually benefit from this option. As explained and summarized below, it is usually the case that the pair's benefit is negative. Hence, our analysis offers prescriptive advice: considerable caution should be exercised prior to granting a right-of-first-refusal.

We first investigate whether there exist mutual gains to trade from a right-of-first-refusal in two extreme cases: the private values model, where there is an efficiency loss due to the right-of-first-refusal but there is no winner's curse, and the pure common values model, where there is a severe winner's curse but no efficiency loss results from granting a right-of-first-refusal.

In a private values setting, it is always a dominant strategy for regular buyers to bid their valuations. Because the price at which the asset is offered to the special buyer is the second highest value of the regular buyers, the special buyer exercises her option whenever her value is greater than the second highest value of the other bidders. Consequently, the allocation is inefficient if her value is between the highest and second highest values of the regular buyers. The gain from this option to the special buyer equals the loss to the seller (Section 4.1). Hence, there are no gains to the pair from granting a right-of-first-refusal to the special buyer.

In a pure common values setting, allocation of the asset to any buyer is efficient: there is no efficiency loss from granting the right-of-first-refusal. Moreover, the winner's curse for the regular buyers is so severe that they submit very low bids, and, in equilibrium, the special buyer always exercises her right-of-first-refusal so no regular buyer ever makes a profit (Section 4.2). Because the right-of-first-refusal allows the seller and special buyer to capture all the surplus from the sale of the asset, the granting of this option is advantageous to the pair.

The results of these two polar cases may lead one to conjecture the following: As the correlation between the buyers' valuations increases (i.e., as one moves from a private values to a common values model), the fraction of the surplus captured by the seller and special buyer through this option increases. However, the situation is more complicated (Section 4.3): while we are able to delineate instances in which the benefit to the pair from granting a right-of-first refusal is positive, we also find instances in which the pair's benefit is negative.

It is unrealistic to assume that all regular buyers elect to participate in the auction when there is a special buyer with a right-of-first refusal – recall that in the Dolphins' sale there was little interest from buyers other than Wayne Huizenga. In Section 4.4 we investigate the impact of non-participation by one or two regular buyers due to the granting of a right-of-first-refusal. In most cases the benefit to the seller-special buyer pair is negative when the presence of a special buyer causes one or two regular buyers to drop out of the second-price auction. This is consistent with Bulow and Klemperer (1996) who show that the seller makes more money with $n+1$ bidders in an English auction with no reserve price than he does with an optimally designed selling mechanism for n bidders.

In summary, the special buyer usually cannot adequately compensate the seller for the right-of-first-refusal in our model. In Section 5, we discuss possible reasons, including the alleviation of market failure, for the existence of the right-of-first-refusal arrangement.[2]

2 The Model

There are $n+1$ potential buyers for an indivisible object. The $(n+1)^{\text{st}}$ buyer has been granted a right-of-first-refusal (henceforth, ROFR) on the sale of the object. The seller elicits bids from regular buyers, giving each regular buyer an opportunity to exceed the current high bid; such a price determination method is conveniently modeled as a second-price auction. Therefore, we assume that initially the seller conducts a second-price auction in which buyers $1, 2, ..., n$ participate, $n \geq 2$. The auction determines

[2]When a buyer of products or services grants his current supplier the right to match the price of another (potential) supplier, it is called a meet-or-release provision or a meet-the-competition clause. This is essentially the mirror-image of the right-of-first-refusal, with the roles of buyer and seller reversed. Similar issues arise in the analysis of a meet-or-release provision. There are exact counterparts of our results in a model of the meet-or-release option.

a potential winner and the selling price P of the object. If buyer $n+1$ decides to exercise her right, she buys the object at price P. If she decides not to exercise her right, then the winner in the auction buys the object and pays the price P. All this is common knowledge among the buyers and the seller. We refer to buyers $1, 2, ..., n$ as regular buyers and to the buyer with the ROFR as the special buyer or buyer $n+1$.

We assume (for simplicity) that the seller derives no value from the object if he fails to sell it. Buyer i has reservation value V_i for the object, and buyer i privately observes a signal X_i about his valuation V_i before bidding, $i = 1, 2 \ldots n+1$. Let $[\underline{X}, \overline{X}]$ denote the support (of the marginal distribution) of X_i; without loss of generality, assume $\underline{X} = 0$. The joint probability density for these random variables is denoted $f(v_1, v_2, ..., v_{n+1},\ x_1, x_2, ..., x_{n+1})$.

We make three assumptions (Aa through Ac below) that are maintained throughout the paper. First, we assume that all the buyers are symmetric in their signals and valuations. That is, the density function satisfies:

Assumption Aa: $f(v_1, v_2, ..., v_{n+1},\ x_1, x_2, ..., x_{n+1}) \equiv f(v_{j_1}, v_{j_2}, ..., v_{j_{n+1}},\ x_{j_1}, x_{j_2}, ..., x_{j_{n+1}})$ where $(j_1, j_2, ..., j_{n+1})$ is a permutation of $(1, 2, ..., n+1)$.

Define

$$V(x_1; x_2, ..., x_{n+1}) \equiv E[V_1 | X_1 = x_1,\ X_2 = x_2, ..., X_{n+1} = x_{n+1}]. \tag{1}$$

Then $V(\cdot)$ is symmetric in the last n arguments. Moreover, because the distribution of all the X's and V's has a density, $V(x_1; x_2, ..., x_{n+1})$ is continuous in all arguments.

Second, we assume that the random variables $(V_1, V_2, ..., V_{n+1},\ X_1, X_2, ..., X_{n+1})$ are weakly affiliated.

Assumption Ab: For any two points $(\underline{v}, \underline{x}) = (v_1, ..., v_{n+1},\ x_1, ..., x_{n+1})$ and $(\underline{v}', \underline{x}') = (v'_1, ..., v'_{n+1},\ x'_1, ..., x'_{n+1})$,

$$f(\underline{v}, \underline{x}) f(\underline{v}', \underline{x}') \quad \leq \quad f(\underline{v} \vee \underline{v}',\ \underline{x} \vee \underline{x}') f(\underline{v} \wedge \underline{v}',\ \underline{x} \wedge \underline{x}'), \tag{2}$$

where $\vee$ indicates the componentwise maximum and $\wedge$ the componentwise minimum.

An implication of affiliation is that $V(x_1; x_2, ..., x_{n+1})$ is non-decreasing in all its arguments. Further, we assume that $V(x_1; x_2, ..., x_{n+1})$ is strictly increasing in x_1.[3] A sufficient condition for $V(x_1; x_2, ..., x_{n+1})$ to be strictly increasing in its first argument is that the affiliation inequality (2) is strict whenever $(v_i, x_i) \neq (v'_i, x'_i)$. See Milgrom and Weber (1982) for more on affiliation (which is the same as monotone positivity due to Karlin and Rinott (1980)).

Third, we assume that, other things being equal, higher values of one's own signal is as at least as good news about the object as higher values of some other buyer's signal. This is formalized by

[3]This is the non-degeneracy assumption of Milgrom and Weber (1982).

Assumption Ac: $V(x_1; x_2, ..., x_{n+1}) \geq V(x_2; x_1, ..., x_{n+1}), \qquad \forall x_1 \geq x_2.$

This is a mild assumption. A consequence of Ac is that it is efficient to allocate the object to the buyer with the highest signal.[4]

In the next section, we look at the existence and uniqueness of equilibrium strategies for the buyers. In particular we find a symmetric Bayesian Nash equilibrium for this game subsequent to the grant of a ROFR to buyer $n+1$.

3 Symmetric Equilibrium

Buyers $1, 2, ..., n$ participate in a sealed-bid second-price auction which determines the selling price P for the object. After the auction, the price P is revealed to buyer $n+1$ who then decides whether to buy the object at that price. If buyer $n+1$ decides not to buy, then the highest bidder in the auction buys the object at price P.

The strategy of buyer i, $i = 1, 2, ..., n$, is a function $b_i : [0, \overline{X}] \to \Re$ which maps i's private signal X_i to a bid $b_i(X_i)$. The strategy of buyer $n+1$ maps the selling price P and her own signal X_{n+1} to a *Buy/Refuse* decision. Suppose that the selling price determined in the auction is p. By affiliation, the special buyer's expected value of the object conditional on p and on her signal realization x is strictly increasing in x. Therefore, given $P = p$, if the special buyer exercises her ROFR when $X_{n+1} = x$, then she would also exercise her ROFR for $X_{n+1} = x'$, $\forall x' > x$. Thus, a rational strategy for the special buyer can be described by a cutoff function $c(\cdot)$, where buyer $n+1$'s decision is to buy if and only if $X_{n+1} > c(P)$.

In a Bayesian Nash equilibrium, each buyer ($i = 1, 2, ..., n+1$) uses a best response to the others' equilibrium strategies. The strategy $b_i(\cdot)$ of buyer i, $i = 1, 2, ..., n$, is *strictly increasing* if $x > x'$ implies that $b_i(x) > b_i(x')$.[5] When buyers $1, 2, ..., n$ use the same strategy, we say that the equilibrium is symmetric. We restrict attention to symmetric Bayesian Nash equilibria in which the regular buyers use an increasing strategy.

At a symmetric equilibrium in which all regular buyers use an increasing strategy, the signal of the second highest bidder (who, along the equilibrium path, has the second highest signal realization among buyers $1, 2, ..., n$) can be inferred from the price P. Buyer $n+1$'s strategy is represented by a cutoff function, $h_* : [0, \overline{X}] \to [0, \overline{X}]$, from the second highest signal among the regular buyers to a realization of X_{n+1} at which she is indifferent between buying or not. Let $b_*(\cdot)$ be each (of the first n) buyer's symmetric equilibrium strategy. Thus, the second highest signal among buyers $1, 2, ..., n$ is inferred to be $b_*^{-1}(P)$. Buyer $n+1$'s equilibrium strategy is to buy

[4] This is a slightly stronger version of the single-crossing condition in Maskin (1992). The single-crossing condition is necessary for a second-price auction to be efficient.

[5] There might be an equilibrium in which some buyer employs a strategy which is not non-decreasing.

if and only if $X_{n+1} \geq h_*(b_*^{-1}(P))$.

Let $Z_{r,k}$, $1 \leq r \leq k$, be the r^{th} highest order statistic of the collection $\{X_1, X_2, ..., X_k\}$. Define

$$W(x,z) \equiv E[V_{n+1}|X_{n+1} = x,\ Z_{2,n} = z].$$

$W(x,z)$ is the expected value of the object for the special buyer when her signal is x and (she infers that) z is the second highest signal for the first n buyers. Observe that if each regular buyer uses the same increasing bid function $b(\cdot)$, then the best-response strategy for buyer $n+1$ is to use the cutoff function

$$h_b(z) \equiv \min\left\{u \in [0, \overline{X}] \,:\, W(u,z) - b(z) \geq 0\right\}. \tag{3}$$

Define

$$\begin{aligned} U(x,y,u) &\equiv E[V_n|X_n = x,\ Z_{1,n-1} = y,\ X_{n+1} \leq u], \\ \phi(x,z,u) &\equiv W(x,z) - U(z,z,u). \end{aligned} \tag{4}$$

The function $U(x,y,u)$, which describes the expected value of the object for buyers $1, 2, \ldots, n$ given certain signal values, is important in determining the equilibrium bids for these buyers. We shall see that the function ϕ is the expected profit of buyer $n+1$ when she exercises her ROFR, the second highest signal realization among buyers $1, 2, ..., n$ is z, the regular buyers believe that buyer $n+1$ will exercise her ROFR at this auction price if and only if $X_{n+1} \geq u$, and $X_{n+1} = x$.

Assumption Ab implies that U and W are strictly increasing in all arguments; moreover, as all signals and valuations have a density, U and W are continuous functions. Define

$$\begin{aligned} h_*(z) &\equiv \min\left\{u \in [0, \overline{X}] \,:\, \phi(u,z,u) \geq 0\right\} \\ &= \min\left\{u \in [0, \overline{X}] \,:\, W(u,z) - U(z,z,u) \geq 0\right\}. \end{aligned} \tag{5}$$

As we shall see in Proposition 1, h_* is an equilibrium cutoff function for buyer $n+1$. The following lemma is useful in proving Proposition 1 and subsequent results.

Lemma 1
(i) h_* is well-defined.
(ii) $h_*(z) \leq z$ for all $z \in [0, \overline{X}]$.
(iii) If $h_*(z) > 0$, then

$$\begin{aligned} W(h_*(z), z) &= U(z, z, h_*(z)) \qquad (6) \\ \textit{i.e.,}\ \ E[V_{n+1}|X_{n+1} = h_*(z),\ Z_{2,n} = z] &= E[V_n|X_n = z,\ Z_{1,n-1} = z,\ X_{n+1} \leq h_*(z)]. \end{aligned}$$

Proof: Observe that for all $z \in [0, \overline{X}]$

$$\begin{aligned}
\phi(z,z,z) &= W(z,z) - U(z,z,z) \\
&= E[V_{n+1}|X_{n+1}=z,\, Z_{2,n}=z] - E[V_n|X_n=z,\, Z_{1,n-1}=z,\, X_{n+1}\le z] \\
&= E[V_{n+1}|X_{n+1}=z,\, Z_{2,n}=z] - E[V_{n+1}|X_{n+1}=z,\, Z_{1,n-1}=z, X_n \le z] \\
&= E[V_{n+1}|X_{n+1}=z,\, Z_{2,n}=z] - E[V_{n+1}|X_{n+1}=z,\, Z_{1,n}=z] \\
&\ge 0.
\end{aligned}$$

The inequality follows from affiliation, and the second-to-last equality uses the symmetry of the distribution of the X_i's and V_i's. Because $\phi(z,z,z) \ge 0$ and ϕ is continuous in all its arguments, $h_*(\cdot)$ is well-defined, piece-wise continuous, and for all $z \in [0, \overline{X}]$, we have $h_*(z) \le z$.

If $h_*(z) > 0$, then (6) follows immediately from (5). ∎

Suppose that the special buyer uses the cutoff function $h(z)$ and the regular buyers use the same bidding strategy. Then each of the regular buyers knows that the most the object can be worth to him, when his signal is z and he obtains the object, is

$$U(z,z,h(z)) \;=\; E\left[V_n|X_n=z, Z_{1,n-1}=z, X_{n+1}\le h(z)\right].$$

If buyer n wins the auction with a signal of z, then $Z_{1,n-1} \le z$; further, if buyer $n+1$ does not exercise her ROFR, then $X_{n+1} \le h(z)$. Therefore, a regular buyer with signal z should not bid more than $U(z,z,h(z))$. Below we show that under certain conditions (i) $U(z,z,h(z))$ is symmetrically the best-response to the cutoff function $h(z)$ and (ii) when $h(z) = h_*(z)$, this bid function forms a symmetric Nash equilibrium with $h_*(z)$. To this end define b_* by

$$b_*(x) \;\equiv\; U(x,x,h_*(x)). \tag{7}$$

If $b_*(x)$ is strictly increasing, then $b_*^{-1}(\cdot)$ is well-defined and the special buyer can infer $Z_{2,n}$ from the auction price P.

Proposition 1 *Suppose that $b_*(x)$, defined by (7), is strictly increasing in x with $h_*(\cdot)$ defined by (5). Then the following is a symmetric Nash equilibrium:*

- *For $i = 1, 2, ..., n$, buyer i with signal X_i bids $b_*(X_i)$ in the second-price auction.*
- *If P is the (random) price in the auction, buyer $n+1$ buys the object at this price if and only if $X_{n+1} \ge h_*(b_*^{-1}(P))$.*

Proof: Suppose that $X_{n+1} \ge h_*(b_*^{-1}(P))$. If buyer $n+1$ exercises her ROFR, then her payoff is

$$\begin{aligned}
W(X_{n+1}, b_*^{-1}(P)) - U(b_*^{-1}(P), b_*^{-1}(P), h_*(b_*^{-1}(P))) &\ge \phi(b_*^{-1}(P), b_*^{-1}(P), h_*(b_*^{-1}(P))) \\
&\ge 0.
\end{aligned}$$

(The second $\geq$ may be replaced by $=$ if $h_*(b_*^{-1}(P)) > 0$.) If instead, $X_{n+1} < h_*(b_*^{-1}(P))$, then the first $\geq$ above is replaced by $<$, and the second $\geq$ is replaced by $=$. Thus, buyer $n+1$'s strategy is a best response.

Suppose that buyer n is informed of $Z_{1,n-1}$. We show that buyer n would not want to change his bid even with this additional information. If he bids high enough to win the auction and the special buyer does not exercise her ROFR, then buyer n's payoff will be:

$$\begin{aligned} U(X_n, Z_{1,n-1}, h_*(Z_{1,n-1})) &- b_*(Z_{1,n-1}) = \\ U(X_n, Z_{1,n-1}, h_*(Z_{1,n-1})) &- U(Z_{1,n-1}, Z_{1,n-1}, h_*(Z_{1,n-1})). \end{aligned}$$

The above quantity is positive if and only if $\{X_n > Z_{1,n-1}\}$. If buyer n does not change his equilibrium bid $b_*(X_n)$ after learning $Z_{1,n-1}$, then he will win only if $\{X_n > Z_{1,n-1}\}$ and $\{X_{n+1} < h_*(Z_{1,n-1})\}$; his profit conditional upon winning is $U(X_n, Z_{1,n-1}, h_*(Z_{1,n-1})) - U(Z_{1,n-1}, Z_{1,n-1}, h_*(Z_{1,n-1}))$. Therefore, he cannot do better by deviating from his equilibrium bid. ∎

We emphasize several consequences associated with granting a ROFR. First, because the special buyer purchases the item whenever $X_{n+1} \geq h_*(Z_{2,n})$ and we have $h_*(z) \leq z$, a ROFR converts the second price auction into something better than a third price auction for the special buyer. Upon winning the object, she pays the second highest among the others' bids; moreover, she may win the object even if her signal is less than the second highest signal of the other buyers. Second, from a regular buyer's standpoint, the presence of a special buyer converts a second price auction with $n+1$ buyers into something worse than a second price auction with n buyers. When a regular buyer, say buyer 1, wins the object, he pays the highest among the other (regular) buyers' bids; but he wins only if his signal is higher than the signals of buyers 2,3,...,n, *and* is sufficiently higher than the special buyer's signal. Third, the allocation of the object may be inefficient because, as already noted, the special buyer may purchase the object even when she does not have the highest signal, i.e., when $X_{n+1} \in [h_*(Z_{2,n}), Z_{1,n})$.[6]

A regular buyer will win only if the special buyer does not exercise her ROFR, i.e., when, after drawing inferences from the auction price about regular buyers' information and also based on her own private information, the special buyer concludes that the object is over-priced. If valuations of buyers are correlated, then a ROFR exacerbates the winner's curse for the regular buyers. This suggests that the regular buyers will bid less aggressively and the average selling price will be lower than if the seller did not grant a ROFR to buyer $n+1$. We demonstrate that this suggestion is indeed true.

Let $\hat{b}(x)$ denote the symmetric equilibrium bid for a buyer with signal x in a

[6]It is clear that if, instead of a second-price auction, another market institution determines the best price from regular buyers, (e.g., a first-price auction or sequential search), the ROFR is still inefficient. Moreover, it confers an advantage on the special buyer.

second-price auction with $n+1$ participants and no ROFR, and let P_{ROFR} and $\hat{P}$ be the selling prices with and without a ROFR, respectively.

Proposition 2
(i) $\hat{b}(x) \geq b_*(x)$.
(ii) $P_{ROFR} \leq \hat{P}$, *with probability one.*
(iii) $E[P_{ROFR}] < E[\hat{P}]$.

Proof: From Matthews (1977) and Milgrom (1981) we know that

$$\hat{b}(x) \;=\; E[V_{n+1} \Big| X_{n+1} = x, Z_{1,n} = x]$$

Thus, recalling that $h_*(x) \leq x$ and the buyers' signals and valuations are symmetrically distributed,

$$\begin{aligned} b_*(x) &= E\left[V_n \Big| X_n = x, Z_{1,n-1} = x, X_{n+1} \leq h_*(x)\right] \\ &\leq E\left[V_n \Big| X_n = x, Z_{1,n-1} = x, X_{n+1} \leq x\right] \\ &= E\left[V_{n+1} \Big| X_{n+1} = x, Z_{1,n} = x,\right] \;=\; \hat{b}(x). \end{aligned}$$

Therefore

$$P_{ROFR} \;=\; b_*(Z_{2,n}) \;\leq\; \hat{b}(Z_{2,n}) \;\leq\; \hat{b}(Z_{2,n+1}) \;=\; \hat{P}.$$

Moreover, because $\text{Prob}[Z_{2,n+1} > Z_{2,n}] > 0$ and, by Assumption Ab, $\hat{b}$ is strictly increasing, we have $E[P_{ROFR}] < E[\hat{P}]$. ∎

The special buyer benefits from her ROFR. First, she wins more often than before because $\{X_{n+1} \geq h_*(Z_{2,n})\} \supseteq \{X_{n+1} \geq Z_{1,n}\}$. Second, she pays a smaller price whenever she wins: $E[P_{ROFR}] < E[\hat{P}]$. Hence, we have:

Corollary 1 *Granting a ROFR to buyer* $n+1$
(i) reduces the expected price obtained by the seller
(ii) increases the payoff to the special buyer
(iii) is inefficient (except in the pure common values case).

The impact of a ROFR on regular buyers is ambiguous. Regular buyers win less often (than they would if buyer $n+1$ did not have a ROFR), but the price they pay upon winning is lower. The next result establishes that when buyers' signals are i.i.d., regular buyers are worse off.[7] The proof of Proposition 3 is given at the beginning of the appendix.

[7] In Section 4 it is established that a ROFR makes regular buyers worse off in the private values and common values cases, whether or not their signals are i.i.d.

Proposition 3 *For any valuation/signal structure in which the signals $X_1, X_2, \ldots, X_{n+1}$ are independent, granting a ROFR to a special buyer reduces the expected profits of the regular buyers.*

3.1 Existence and Uniqueness

We now turn to conditions under which a symmetric equilibrium exists (i.e., sufficient conditions for the right hand side of (7) to be strictly increasing) and is unique.

Without further assumptions on the distribution of the X_i's and V_i's or on $h_*(\cdot)$, there is nothing to guarantee that $b_*(x)$, as it is defined, is strictly increasing. If $h_*(\cdot)$ is non-decreasing, then affiliation implies that $b_*(x) = U(x, x, h_*(x))$ is strictly increasing. It seems natural that $h_*(\cdot)$ would be non-decreasing. Example 1 reveals that this is not always the case.

Example 1: Let $V_i = aV + (1-a)X_i$ with $a \in (0,1)$ and $V = Z_{1,n+1}$. The signals $X_1, X_2, \ldots, X_{n+1}$ are i.i.d. random variables with

$$P(X \geq x) \;=\; \frac{e}{(x+e)\left[\log(x+e)\right]^{1+\alpha}} \qquad \text{for } x \in [0,\infty),$$

where e is the exponential constant and $\alpha > 0$. Thus, the buyers' valuations are correlated, while their signals are not. Then

$$E\left[X|X \geq z\right] \;=\; z + \left(\frac{z+e}{\alpha}\right)\log(z+e).$$

It can be shown (using equation (11) of Section 4.3) that

$$h_*(z) \;=\; \left(z - \frac{a}{1-a}E\left[X - z|X \geq z\right]\right) \vee 0.$$

Thus, we have

$$h_*(z) \;=\; z - \frac{a}{1-a}E\left[X - z|X \geq z\right] \;=\; z - \frac{a}{\alpha(1-a)}(z+e)\log(z+e),$$

if the expression on the right-hand side is positive; otherwise $h_*(z) = 0$. If a is close to 1, then the right-hand side is negative for all z, so that $h_*(z) = 0$ for all z. To ensure that $h_*(z^*) > 0$ and $z^* > 0$, restrict a so that $a < \frac{\alpha}{C+\alpha}$, where C solves $e^{C-2} = C$ [$C \approx 3.1462$], and define $z^* \equiv e^{\frac{\alpha(1-a)}{a}-1} - e$. With this restriction on a, it is easy to show that $h_*(z)$ is positive and strictly increasing on the interval $[0, z^*)$ and strictly decreasing for $z > z^*$ until it hits zero, remaining there for all larger values of z.

The key to Example 1 is the fat tail of the X-distribution. As the second-highest signal $Z_{2,n}$ (which in this case equals the auction price) rises, the expectation of the largest signal rises faster than any linear function of $Z_{2,n}$. This raises the special buyer's estimate of the value of the object, which, in some circumstances, more than

makes up for the higher price. In fact if a is too large, this effect is so pronounced that the special buyer never declines to buy the object. Only with small a does the rise in price at first outweigh the subsequent rise in valuation. But, no matter what the value of a is in this example, if $Z_{2,n}$ becomes large enough, buyer $n+1$ will exercise her ROFR, regardless of the value of her own signal.

Because the bid function $b_*(x) \equiv U(x, x, h_*(x))$ is strictly increasing, we have demonstrated that having $h_*(\cdot)$ strictly increasing (though it is sufficient) is not necessary for $b_*(x)$ to be strictly increasing. $\triangle$

To ensure the existence of the Nash equilibrium described in Proposition 1, we need to restrict the class of distributions on the X_i's and V_i's. We make the natural assumption that

Assumption A1: *$\phi(u, z, u)$ is non-increasing in z for all u.*

In other words, raising a price-determining regular buyer's signal has at least as much impact on this regular buyer's valuation when he assumes that he wins the object, as it does on the valuation of buyer $n+1$.

With b_* defined in (7) and h_* defined in (5), we have

Proposition 4 *Under assumption A1, $h_*(\cdot)$ is non-decreasing. Thus, $b_*(x)$ is strictly increasing, and the strategies $(b_*, b_*, \ldots, b_*; h_*)$ form a Nash equilibrium.*

Proof: Fix $0 \le z < z' \le \overline{X}$. If $h_*(z) = 0$, there is nothing to prove. If $h_*(z) > 0$, then the definition of $h_*(z)$ and (6) yield, for all $u < h_*(z)$,

$$\phi(u, z', u) \;\le\; \phi(u, z, u) \;<\; \phi(h_*(z), z, h_*(z)) \;=\; 0.$$

By definition $h_*(z')$ must be $\ge h_*(z)$. This implies that $b_*(x)$ is strictly increasing. This, in turn, implies that Proposition 1 holds. ∎

We would like to show that $(b_*, b_*, \ldots, b_*; h_*)$ is the unique symmetric solution to this problem. However, looking at the proof of Proposition 1, we see that any pair of functions $(b(\cdot), h(\cdot))$ that satisfy

C1. $\phi(h(z), z, h(z)) \ge 0$ for all z,

C2. $\phi(h(z), z, h(z)) = 0$ whenever $h(z) > 0$, and

C3. $b(x) \equiv U(x, x, h(x))$ strictly increases with x

form a symmetric equilibrium. The function $h_*(\cdot)$ is the smallest h-function that is in an equilibrium pair (b, h). But there is nothing in the structure of $\phi(x, z, u)$ that precludes there being another such function. For instance,

$$h^*(z) \;\equiv\; \max\left\{u \in [0, \overline{X}] \mid \phi(u, z, u) \le 0\right\}.$$

Therefore, if we are to have any hope of establishing (b_*, h_*) as the unique equilibrium pair, we must restrict the class of distributions on the X_i's and V_i's so that the function $k(\,\cdot\,; z) \equiv \phi(\,\cdot\,, z, \,\cdot\,)$ has at most one zero. To this end, we make another logical assumption:

Assumption A2: *$\phi(u, z, u)$ is strictly increasing in u for all z.*

Recall that $\phi(u, z, u)$ is the expected profit of buyer $n+1$ when she exercises her ROFR, $Z_{2,n} = z$, $X_{n+1} = u$, and the regular buyers believe that buyer $n+1$ will exercise her ROFR at the auction price $b_*(z)$ if and only if $X_{n+1} \geq u$. Under A2, it is obvious that for each z

$$\phi(u, z, u) > 0, \quad \forall u > h_*(z).$$

Therefore, for every z there is at most one point $u\,[= h_*(z)]$ at which $\phi(u, z, u)$ can be equal to 0. In this case $h_*(\cdot)$ is the only function that satisfies conditions C1-C3.

Proposition 5 *Given A1 and A2, suppose (b_0, h_0) is a pair of strategies that form a symmetric Nash equilibrium. If b_0 is strictly increasing and h_0 is non-decreasing, then $h_0(z) = h_*(z)$, $\forall z$ and*

$$\begin{aligned} b_0(x) &\leq W(0, x), \ \forall x \leq \underline{z}, \\ b_0(x) &= b_*(x), \ \text{for almost all } x > \underline{z}, \end{aligned}$$

where $\underline{z} \equiv \sup\{z \in [0, \overline{X}] | h_*(z) = 0\}$.

When $X_i \leq \underline{z}$, $i \leq n$, regular buyer i will not win the object even if he is the highest bidder in the auction because the special buyer will exercise her ROFR as $h_*(Z_{2,n}) \leq h_*(X_i) = 0$. Hence, a regular buyer's bid function is not unique for signals at which he will not win.

Finally, we discuss the restrictions imposed by A1 and A2 when each buyer's valuation is a convex combination of a private value and a common value: $V_i = aV + (1-a)X_i$, $a \in [0, 1]$. We have

$$\begin{aligned} & \phi(u, z, u) \\ \equiv\ & (1-a)(u-z) + a\Big(E[V|X_{n+1} = u, Z_{2,n} = z] \ - \ E[V|X_{n+1} \leq u, Z_{1,n} = z, Z_{2,n} = z]\Big) \qquad (8) \\ =\ & (1-a)(u-z) + a\Big(E[V|X_{n+1} = u, Z_{1,n} \geq z, Z_{2,n} = z] \ - \ E[V|X_{n+1} \leq u, Z_{1,n} = z, Z_{2,n} = z]\Big) \end{aligned}$$

In the private values case ($a = 0$), A1 and A2 are satisfied. A1 requires that the expression multiplying a is non-increasing in z; A2 ensures that this expression is strictly increasing in u. For any $a \in (0, 1]$, Example 1 does not satisfy A1 and $h_*(\cdot)$ is not non-decreasing.

4 The value of the right-of-first-refusal

We now investigate whether the seller has an incentive to grant a ROFR to buyer $n+1$. We have shown that granting the ROFR to a special buyer reduces the selling price of the object in a second-price auction: the seller is always worse off when a buyer has been granted the ROFR. Does the net benefit that the ROFR extends to the special buyer outweigh the loss of auction revenue that it costs the seller? To answer this question we compare the *ex ante* expected profit (i.e., computed before buyer $n+1$ observes her signal) to the seller and the special buyer (buyer $n+1$) as a pair with and without a ROFR. We assume that if buyer $n+1$ does not have a ROFR, she will participate in the auction. Moreover, unless otherwise stated, regular buyers participate in the auction whether or not the special buyer is granted a right-of-first-refusal. We are able to delineate instances in which the net benefit to the pair of granting this right is positive, whence this economic arrangement does indeed fulfill a purpose. But we also find instances wherein the pair's net benefit is negative.

In Section 4.1 we examine the case when buyers have private valuations for the object. The pure common values and the correlated values cases are analyzed in Sections 4.2 and 4.3, respectively. Finally, in Section 4.4 we consider the effect of a few of the regular buyers not participating in the presence of the ROFR.

4.1 Private values

In this situation, $V_i = X_i$ for all i whence $W(x,z) = x$, $U(x,y,u) = x$, and $\phi(u,z,u) = u - z$. Thus, $h_*(z) \equiv z$ and $b_*(x) = x$. In other words, the bids of regular buyers in the second-price auction are unaffected by the presence of the special buyer. Indeed, it is a dominant strategy for regular buyers to bid their valuations, and the special buyer should never purchase the object when the price is more than her valuation/signal. Nevertheless, because the special buyer with a ROFR has the option of buying at a price equal to the second highest valuation of the other buyers, the ROFR imparts a strictly positive benefit to her.

In an auction without a ROFR three separate outcomes can occur: buyer $n+1$ has the highest signal, buyer $n+1$ has the second highest signal, or the signal of buyer $n+1$ is less than $Z_{2,n}$. In the first two cases the seller/special buyer pair's profit is X_{n+1} because either buyer $n+1$ obtains the object ($X_{n+1} \geq Z_{1,n}$), or one of buyers 1 through n wins the auction and pays the second highest bid, X_{n+1}, to the seller ($Z_{1,n} > X_{n+1} \geq Z_{2,n}$). In the third case ($Z_{2,n} > X_{n+1}$), one of the regular buyers purchases the item at a price of $Z_{2,n}$ and the pair receives $Z_{2,n}$. Thus, the pair's profit is $\max\{X_{n+1}, Z_{2,n}\}$.

When buyer $n+1$ has a ROFR, only two things can happen: either the special buyer obtains the object ($X_{n+1} \geq Z_{2,n}$), or the special buyer does not obtain the object and the seller receives $Z_{2,n}$ ($X_{n+1} < Z_{2,n}$). Therefore, the pair's profit is $\max\{X_{n+1}, Z_{2,n}\}$, and we have proved

Proposition 6 *Under private values, the net benefit (to the seller/the special buyer) of a ROFR is zero with probability one.*

A ROFR gives the special buyer the right to buy at a price equal to the third-highest among all $n+1$ buyers' values; the special buyer will exercise this right if hers is the second-highest or highest value. The special buyer wins more often and pays a lower price (conditional upon winning) compared to the benchmark case in which she competes in a second-price auction with the other n buyers. This gain exactly offsets the lower price (equal to the 3rd highest rather than the 2nd highest of $n+1$ signals) that the seller obtains with a ROFR.

If buyer $n+1$ exercises her ROFR, then the allocation is not Pareto optimal when $X_{n+1} \in [h_*(Z_{2,n}), Z_{1,n}) = [Z_{2,n}, Z_{1,n})$. Thus, the expected surplus strictly decreases when a ROFR is granted.[8] This, together with Proposition 6 implies:[9]

Corollary 2 *Under private values, a buyer is strictly worse if any one of the other buyers is granted a ROFR.*

4.2 Common values

When all the buyers' valuations are identical ($V_i = V$), the effect of the ROFR upon the auction and upon the determination of the winner is dramatic. In this case the special buyer always exercises her ROFR, without regard to her signal. To see this, note that for any $z \in [0, \overline{X}]$

$$\begin{aligned}
\phi(0,z,0) &= W(0,z) - U(z,z,0) \\
&= E[V|X_{n+1}=0,\, Z_{2,n}=z] - E[V|X_n=z,\, Z_{1,n-1}=z,\, X_{n+1}=0] \\
&\geq E[V|X_{n+1}=0,\, Z_{2,n}=z] - E[V|X_n\geq z,\, Z_{1,n-1}=z,\, X_{n+1}=0\,] \\
&= E[V|X_{n+1}=0,\, Z_{2,n}=z] - E[V|X_{n+1}=0,\, Z_{2,n}=z] \\
&= 0.
\end{aligned}$$

Therefore, $h_*(z) \equiv 0$: buyer $n+1$ buys the object regardless of the price set in the auction, and buyers 1,2,...,n make zero profit in this equilibrium.

Proposition 7 *Under pure common values, if the seller grants buyer $n+1$ a ROFR, the pair appropriates the entire surplus and the regular buyers never buy the object.*

When buyer $n+1$ has a ROFR, the sum of the profit of the seller and the special buyer is equal to the full value of the object. In an auction without the ROFR, this

[8] In order to avoid confusion, we use the word "surplus" to refer to the gains from the sale of the object, and "net benefit" to refer to the increase in the profit to the seller/special buyer pair from the granting of a ROFR. Because the seller derives no utility from retaining the object, the surplus equals the value of the buyer who obtains the object.

[9] Corollary 2 does not assume that the X_i's are independently distributed; hence, it is not a special case of Proposition 3.

pair obtains less than the full value of the object: when buyer $n+1$ does not have the largest signal, the buyer of the object (one of buyers $i = 1, 2, ..., n$) will extract a profit. Thus, the pair is better off with a ROFR.

Milgrom and Weber (1981) showed that in a pure common value auction, if some buyer A's information partition is finer than some other buyer B's information partition, then B's expected profit is zero. We have shown that when one buyer (the special buyer) observes, in addition to her own signal, the second order statistic of other buyers' signals, then the regular buyers' profit is zero with probability one. This is not a strengthening of the result in Milgrom and Weber (1981) because in their model both buyers move simultaneously whereas in our model the special buyer moves after observing the second highest of the others' bids; this intensifies the winner's curse for the regular buyers (our counterpart of Milgrom and Weber's less well-informed buyer B).

4.3 Correlated values

In the private values case, the inefficiency resulting from the ROFR is borne entirely by the regular buyers as the seller/special buyer pair is equally well-off with or without a ROFR. Granting a ROFR bestows upon the pair a net benefit of zero. Under common values, there is no inefficiency associated with a ROFR. However, the winner's curse for the regular buyers is severe enough that the special buyer always wins and the pair captures the entire surplus: granting a ROFR bestows upon the pair the maximum possible net benefit (equal to the fraction of the surplus captured by regular buyers in the absence of a ROFR).

From this one might be tempted to conjecture that the net benefit from a ROFR to the pair increases as the degree of correlation between buyer valuations increases. However, things are somewhat more complicated. The net benefit of a ROFR to the pair depends not only on the degree of correlation between buyer valuations and on the number of buyers but also on the functional form of V. For general V, there is little that one can say about the value of granting the ROFR. This inconclusiveness is not due to our inability to find general results but rather to the non-existence of general results.

Under correlated values, the ROFR leads to an exacerbated winner's curse for the regular buyers, as in the common values case, and an inefficiency, as in the private values case. Assume for now that all regular buyers participate even when there is a ROFR. The analysis below hinges on the following four possible cases:[10]

I. $X_{n+1} \geq Z_{1,n}$. The special buyer receives the object whether or not she has

[10]Recall that $\hat{b}(\cdot)$ is the symmetric equilibrium strategy in the auction with $n+1$ buyers and no ROFR and $b_*(\cdot)$ is the symmetric equilibrium strategy in the auction for each of the n regular buyers when there is a ROFR. An implication of the exacerbated winner's curse for the regular buyers is that $b_*(\cdot) \leq \hat{b}(\cdot)$.

the ROFR. There is no net benefit to the pair; moreover, the outcome with or without the ROFR is Pareto optimal.

II. $Z_{1,n} > X_{n+1} \geq Z_{2,n}$. The special buyer obtains the object with the ROFR and sets the price that the winner pays the seller without the ROFR. The outcome with the ROFR is not Pareto optimal (except in the common values case). However, the slice of the pie that the pair extracts never decreases (and usually increases) when they trade the ROFR. This is because the special buyer's expected valuation of the object is never less than $\hat{b}(X_{n+1})$, her equilibrium bid without the ROFR.

III. $Z_{2,n} > X_{n+1} \geq h_*(Z_{2,n})$. Here the pair receives the value of the object to the special buyer when the ROFR is granted, and they receive $\hat{b}(Z_{2,n})$ when it is not. With a ROFR the surplus shrinks even further than in II as the special buyer does not even have the second highest signal, let alone the highest. The smaller total surplus can adversely affect the pair's net benefit from a ROFR on this set. Often, the value V_{n+1} of the object to the special buyer will be less than $\hat{b}(Z_{2,n})$.

IV. $h_*(Z_{2,n}) > X_{n+1}$. With or without a ROFR, the special buyer does not purchase the object. The pair receives $b_*(Z_{2,n})$ with a ROFR and $\hat{b}(Z_{2,n})$ without. The outcome is always Pareto optimal. But the net benefit to the pair from a ROFR is non-positive as $b_*(z) \leq \hat{b}(z)$ for all z.

Thus, only in cases I and IV is the object allocated to the same buyer, with or without a ROFR; the allocation in cases II and III is inefficient. We summarize the gains to the seller/special buyer pair in the following diagram:

$E[b_*(Z_{2,n}) - \hat{b}(Z_{2,n})\|IV] \leq 0$	$E[V_{n+1} - \hat{b}(Z_{2,n})\|III] = ?$	$E[V_{n+1} - \hat{b}(X_{n+1})\|II] \geq 0$	$E[V_{n+1} - V_{n+1}\|I] = 0$
IV	**III**	**II**	**I**
$h_*(Z_{2,n})$	$Z_{2,n}$	$Z_{1,n}$	

Diagram 1: The seller/buyer pair's net benefit due to the ROFR, when X_{n+1} is in either set I, II, III, or IV.

We can understand the results of Sections 4.1 and 4.2 in terms of Diagram 1. In the private value case, set III disappears because $h_*(z) \equiv z$. Furthermore, because buyers always bid their valuations, regardless of the presence of a ROFR, the expected surplus from the presence of a ROFR is zero on sets II and IV.

In the common value case, set IV disappears, as $h_*(z) \equiv 0$. In addition, because buyers have the same valuation *ex post*, the total surplus does not shrink on set III or set II when the ROFR is present. The net benefit from the ROFR, therefore, is non-negative on III and is positive on II. Thus, the pair's net benefit from the ROFR is always positive.

In order to analyze the net benefit to the seller/special buyer pair from a ROFR when valuations are correlated, we need to limit the scope of our inquiry. Therefore, in the remainder of this section, we only shall look at a subset, albeit an important one, of the possible affiliated distributions of the V_i's. We assume that buyer i's valuation V_i takes the form

$$V_i \;=\; aV + (1-a)X_i, \quad \text{where } a \in [0,1], \tag{9}$$

and V is the common component of buyers' valuations.[11] We have already examined the case $a = 0$ (Section 4.1) and $a = 1$ (Section 4.2). Next, we consider the case when (i) $a \in (0,1)$, (ii) the X_i's are independently distributed, and (iii) V has specific functional forms with respect to the X_i's.

Let R_1 be the profit to the pair without the ROFR, and let R_2 be the profit to the pair with the ROFR:

$$\begin{aligned} R_1 &\equiv V_{n+1}\, 1_I + \hat{b}(X_{n+1})\, 1_{II} + \hat{b}(Z_{2,n})\, 1_{III \cup IV} \\ R_2 &\equiv V_{n+1}\, 1_{I \cup II \cup III} + b_*(Z_{2,n}) 1_{IV}, \end{aligned}$$

where 1_S is the indicator function of the set S. Thus, the (expected) net benefit to the pair due to the ROFR is

$$\begin{aligned} E[R_2 - R_1] \;=\; & E\left[\{V_{n+1} - \hat{b}(X_{n+1})\} 1_{II}\right] \\ & +\; E\left[\{V_{n+1} - \hat{b}(Z_{2,n})\} 1_{III}\right] + E\left[\{b_*(Z_{2,n}) - \hat{b}(Z_{2,n})\} 1_{IV}\right]. \end{aligned} \tag{10}$$

In Section 4.3.1 below we consider an example where the signals are uniformly distributed and V is the average of the X_i's. We show $E[R_2 - R_1]$ can be positive or negative: the sign depends on the values of a in (9) and n. In Section 4.3.2 we show that when V is a (non-decreasing) function of $Z_{1,n+1}$ and $Z_{2,n+1}$ only, $E[R_2 - R_1]$ is positive, regardless of the distribution of the X_i's and the values of a and n. On the other hand, when V is a function of the $Z_{k,n+1}$'s for $k \geq 2$ but not a function of $Z_{1,n+1}$, we show that the pair never benefits from a ROFR.

Let us turn briefly to the calculation of h_*. From (5) we know that either (i) $h_*(z) = 0$ and $\phi(0, z, 0) \geq 0$ or (ii) $h_*(z) > 0$ and $\phi(h_*(z), z, h_*(z)) = 0$. In the latter case (8) implies that $h_*(z)$ must satisfy

$$\begin{aligned} & z - h_*(z) \\ &= \frac{a}{1-a}\Big(E[V | X_{n+1} = h_*(z),\, Z_{2,n} = z] - E[V | X_{n+1} \leq h_*(z),\, Z_{1,n} = z,\, Z_{2,n} = z] \Big). \end{aligned} \tag{11}$$

We use (10) and (11) in the remainder of the paper.

[11] Note that $\mathrm{Cov}[V_i, V_j] = a^2 \,\mathrm{Var}[V] + 2a(1-a)\mathrm{Cov}[X_i, V] + (1-a)^2 \mathrm{Cov}[X_i, X_j]$. Thus, if the signals are independent and $\mathrm{Var}[V] \approx \mathrm{Var}[X_i]$, then the level of correlation between buyers' values increases with a.

4.3.1 The average of independent uniform signals case

In general nothing definitive can be said about the value of the ROFR to the seller and special buyer. To illustrate this indeterminacy, below we look at the value of the ROFR when $V_i = aV + (1-a)X_i$, V is the average of all the buyer's signals, and the X_i's are i.i.d. uniform random variables on $[0,1]$. We analyze this example for two reasons. First, the calculations are straightforward. Second, and more important, for this valuation structure the expected value of the common part V of the value of the object to each buyer is the same $(1/2)$, regardless of the number $n+1$ of buyers. In affecting a comparative statics analysis on the number of buyers, it must be that the expectation of V, the common part of the object's value, does not vary with the number of buyers.

Suppose that $h_*(z) > 0$. Then using the fact that the X_i's are i.i.d. uniform on the unit interval and inserting $V = \frac{1}{n+1}\sum_{i=1}^{n+1} X_i$ in (11), we have

$$\begin{aligned} z - h_*(z) &= \frac{a}{(1-a)}\frac{1}{n+1}\Big\{h_*(z) + E[Z_{1,n}|Z_{2,n} = z] - (E[X_{n+1}|X_{n+1} \leq h_*(z)] + z)\Big\} \\ &= \frac{a}{(1-a)}\frac{1}{n+1}\left(h_*(z) + \frac{1+z}{2} - \frac{h_*(z)}{2} - z\right). \end{aligned}$$

Thus,

$$h_*(z) \equiv \max\Big(z - \underline{z}, 0\Big), \tag{12}$$

where

$$\underline{z} \equiv \frac{a}{1 + (2n+1)(1-a)}. \tag{13}$$

Consistent with earlier results, $h_*(z) \equiv z$ in the private values case ($a = 0$) and $h_*(z) \equiv 0$ in the common values case ($a = 1$).

We claim that

$$\begin{aligned} & E\Big[(R_2 - R_1)\Big] \\ = \ & \frac{a}{(n+1)^2}\left(\frac{1}{n+2} + \underline{z} - \frac{n+1}{2}\underline{z}^n + (n-1)\underline{z}^{n+1} - \frac{n(n-1)}{2(n+2)}\underline{z}^{n+2}\right) \\ & - (1-a)\left(\frac{1}{2}\underline{z}^2 - \frac{n}{n+1}\underline{z}^{n+1} + \frac{n-1}{n+2}\underline{z}^{n+2}\right). \end{aligned} \tag{14}$$

The proof of this equation is in the appendix. We can, via (14), assess the pair's benefit when a ROFR is granted.

The expected surplus, assuming that the outcome is efficient, is $E[aV + (1-a)Z_{1,n+1}] = \frac{(2-a)n+2}{2(n+2)}$. This is the most that the pair can possibly garner. For each (a,n)-pair with $a \in [0,1]$ and $n \geq 2$, set

$$\Delta(a,n) = \frac{E[R_2 - R_1]}{E[aV + (1-a)Z_{1,n+1}]}.$$

Thus $\Delta(a,n)$ is the net benefit to the pair from a ROFR expressed as a fraction of the expected surplus. Using $\Delta(a,n)$, we can study the effect that varying a and n has on the expected returns from the ROFR. Because $\underline{z}=0$ when $a=0$, $\Delta(0,n)=0$ for all n, as anticipated. By Proposition 7, $\Delta(1,n)>0$ for all n. In fact, $\underline{z}=1$ when $a=1$, and $\Delta(1,n) = 2n/[(n+1)^2(n+2)] > \max\{\Delta(a,n) : a<1\}$ for each n. Further, for each a, $\Delta(a,2)=\max\{\Delta(a,n) : n\geq 1\}$ for each a. Therefore, our interest lies with the value of $\Delta(a,n)$ when $a\in(0,1)$ and $n>2$.

Figure 1 shows the contour map of $\Delta(a,n)$ for a between 0 to 1 and n between 0 to 30. This map has 7 contour lines that indicate level sets of $\Delta(a,n)$ with values ranging from -0.0015 (the inner most curve) to 0.0015 (the outer most). From this contour map we see that for $n\leq 6$ the pair's net benefit from the ROFR is positive, regardless of the value of $a>0$. However, for each $n>6$ there is a range of a values for which the pair's net benefit is negative. As n grows, this range widens.

As n increases, $\Delta(a,n)$ generally decreases. Interestingly, for $n>15$, $\Delta(\cdot,n)$ achieves its minimum at very high values of a, i.e. at $a\in(0.95,1)$. Thus, a slight decrease in a from 1 to something just less than 1 can have a large effect on the benefit of the ROFR.

4.3.2 Net benefit from a ROFR and the nature of the common value

In this section, we show that the net benefit to the seller/special buyer pair from a ROFR depends critically on the nature of the common value V. In particular, if V is a function of $Z_{1,n}$ and $Z_{2,n}$ (but not $Z_{k,n}$, $k\geq 3$), then $E[R_2-R_1]\geq 0$ for all a and n and any distribution of the X_i's. Instead, if V does not depend on $Z_{1,n}$, then necessarily $E[R_2-R_1]\leq 0$.

Without loss of generality, write the correlated values model as

$$V_i = ag(Z_{1,n+1}, Z_{2,n+1}, ..., Z_{n+1,n+1}) + (1-a)X_i$$

where g is non-decreasing.[12]

Proposition 8

(i) If $V=g(Z_{1,n+1},Z_{2,n+1})$ and g is a non-decreasing function in both of its arguments, then $E[R_2-R_1]\geq 0$.

(ii) If, in addition, g is non-constant in its first argument (and $a>0$), then $E[R_2-R_1]>0$.

The proof of this proposition (see appendix) establishes a stronger result: the gains to the pair are zero on sets I and IV and positive on II and III (where the sets

[12]In Section 4.3.1, $g(Z_{1,n+1},Z_{2,n+1},...,Z_{n+1,n+1}) = \frac{1}{n+1}\sum_{k=1}^{n+1} Z_{k,n}$. More generally, we can replace V by its conditional expectation $g(Z_{1,n+1},Z_{2,n+1},...,Z_{n+1,n+1}) \equiv E[V|X_1,X_2,...,X_{n+1}]$. In many economically interesting settings, the function g is symmetric in its $n+1$ arguments; however, as per the discussion after Proposition 8, this need not be the case.

I–IV are defined in Diagram 1). A buyer with signal x proceeds as if his signal is the highest and is tied with another buyer's signal: he presumes that the value of the object is $ag(x,x)+(1-a)x$. Hence, $b_*(x) \equiv \hat{b}(x) = ag(x,x)+(1-a)x$, and there is no loss of revenue on set IV.

One setting in which Proposition 8 applies is an art-object auction. Consider the auction of a painting that is known to be authentic. Each buyer knows his private value X_i for the painting. The X_i's are individual estimates of aesthetic worth and, thus, are independent but assumed to be taken from a common distribution. Each buyer's total valuation of the painting is a combination of his private value and the market value because the painting is valued for both its private worth and its resale value. Because the painting is known to be authentic, a good proxy for the resale value of the painting is the largest of the $n+1$ private values; low private estimates of its worth do not directly affect the resale value. In this case a reasonable valuation model for a painting to be sold at auction is the correlated values model with $V = Z_{1,n+1}$. Here a indicates how heavily buyers weigh the resale value when considering the purchase of the painting.

If V depends only on $Z_{2,n+1}$, then it is easy to show that $h_*(z) = z$ and that $b_*(x) = \hat{b}(x) = ag(x) + (1-a)x$ for all x. Thus, the net benefit to the pair from a ROFR equals zero. This foreshadows the next result.

Proposition 9

(i) If $V = g(Z_{2,n+1}, Z_{3,n+1}, \ldots, Z_{n+1,n+1})$ and g is a non-decreasing function in each of its arguments, then $E[R_2 - R_1] \leq 0$.

(ii) Furthermore, if $g(z,\cdot,\ldots,\cdot)$ is not equal to a constant almost everywhere for a z-set of positive F-measure (i.e., if there is a non-trivial dependence on the $Z_{k,n}$'s for $k \geq 3$), then $E[R_2 - R_1] < 0$.

4.4 Effect of non-participation by regular buyers

Proposition 3 and Corollary 2 showed that regular buyers are worse off when a ROFR is granted to the special buyer. If regular buyers incur (at least) a small cost of bid preparation and information gathering and if the reduction in expected profit due to the presence of a ROFR is large enough, some, if not all, of the regular buyers might decide not to participate in the second-price auction. We now show that if a few of the regular buyer do not participate in the auction, then, except in the pure common values case, the profits accruing from a ROFR to the pair can vanish rapidly.

Private Values: By Proposition 6, the pair's net benefit from a ROFR is zero, while the pair's profit with or without an ROFR, is $\max\{X_{n+1}, Z_{2,n}\}$. If the ROFR leads to non-participation by one regular buyer, the pair's profit decreases to $\max\{X_{n+1}, Z_{2,n-1}\}$. Thus, depending on the price paid by the special buyer for the ROFR, either the seller or the special buyer will be strictly worse off with the ROFR.

Common Values: The pair is strictly better off with a ROFR, even if some or all

regular buyers do not participate (Proposition 7). It would be naive to assume that a regular buyer will participate in an auction in which he will never purchase the object. If most or all of the regular buyers stay away, they do not assist in price discovery: buyer $n+1$ and the seller may not be able to agree on a price. If the seller does not foresee this possibility, he might fail to extract a sufficiently high price to cover the implicit cost associated with granting the ROFR. Mr. Huizenga obtained his right-of-first-refusal for the Miami Dolphins in 1990, four years before its sale, when he purchased a 15% equity stake in the company. The family which owned the Miami Dolphins at that time did not receive adequate compensation for the ROFR from Mr. Huizenga (see Bulow (1995) and Brandenburger and Nalebuff (1996)).

Correlated Values: First, consider the example in Section 4.3.1 where V is the average of uniform signals. Figure 1 shows that for some values of a and n, the pair benefits from a ROFR, provided that all n regular bidders participate in the auction. The effect of non-participation by just one of the regular buyers (when there is a special buyer with a ROFR) is dramatic. As shown in Figure 2, for all values of $a \leq 0.9$, the gain associated with a ROFR is negative if one regular buyer drops out.

Next, we turn to the case when $V = g(Z_{1,n+1}, Z_{2,n+1})$, where Proposition 8 showed that $E[R_2 - R_1]$, the benefit to the pair if all regular buyers participate, is positive. Consider an example where $V = Z_{1,n+1}$ and the distribution of X_i is uniform on $[0, 1]$. Figure 3 shows the region of profitability in the presence of a ROFR as a function of n, a, and the number of regular buyers who fail to participate when there is a ROFR. When $a \leq 0.5$, a ROFR is never profitable for the pair if at least 2 regular buyers drop out.

We know that if V is not a function of $Z_{1,n+1}$, the pair experiences no net benefit from a ROFR. Usually, V depends on all the $n+1$ signals, including $Z_{1,n+1}$ (as in the example in Section 4.3.1). Therefore, in general one cannot draw definitive conclusions about $E[R_2 - R_1]$. However, if one or two regular buyers do not participate, we anticipate that the pair's net benefit associated with a ROFR will not be positive.

5 Concluding remarks

When the seller awards a special buyer the ROFR, he confers upon her a distinct advantage: she is not only more likely to purchase the asset from him but also pays a lower price than she would in the absence of possessing this right. Concomitantly, the seller places himself in an inferior position by granting such a right. Presumably, the special buyer compensates the seller, in some manner, at the time he grants her the ROFR. Thus, it is in the interest of the seller to grant a ROFR to a special buyer only if it is jointly beneficial to them. We show that under private values, the net benefit from a ROFR to the special buyer is exactly equal to the cost to the seller; further, the social cost of a ROFR, as measured by the reduction in gains from trade of the object, is borne entirely by the regular buyers. When buyers' valuations are correlated, the presence of a special buyer exacerbates the winner's curse on regular

buyers, and they respond by lowering their bids. In either case, if the costs of bid preparation for (at least some of the) regular buyers are higher than their expected profits, some of the regular buyers may not participate in the price discovery stage. Consequently, the special buyer's expected gain from the ROFR is usually less than the expected loss to the seller.

In short, the net benefit to the seller and special buyer is usually negative, so we should anticipate that the ROFR will rarely appear in a contract. However, in certain industries this economic arrangement is commonplace. Presumably, it must resolve some economic problem, either of the broad market or of the narrower contract between firms, not captured by our model. One such problem that our model does not capture is a market failure, as exemplified below.

For specificity, suppose that there are n publishing firms that might be interested in signing a particular artist to a book or recording contract. The artist is equally likely to be a success or a failure. The net profit associated with success is uniform on the interval [0, 1.5] whereas failure produces a loss which is uniform on [-2, 0]: the average loss is 1 but the average profit is only .75. There would be no reason to sign the artist to a contract. Suppose further, however, that an artist who is signed will be successful on his next artistic contract if and only if he was successful on his first contract; moreover, for simplicity, suppose that the net profit on the second contract for a successful artist is also uniformly distributed on [0, 1.5]. Suppose each firm has probability $1/n$ of signing an artist who was successful on his first contract to a second contract. Then if n is large ($n \geq 4$ in this example), the publisher's expected return to signing an artist to his initial contract is strictly negative. Thus, if all publishers compete on an equal footing for a successful artist's second work, the artist will not find a publisher for his first work, and his success or failure will not be revealed. Observe that if the artist's first work were published, the average surplus in this two period model would be strictly positive (-0.125 in the first period when the artist's type is unknown and 0.375 in the second period after the artist's type is revealed). Thus, we have a market failure wherein the initial publisher who invests in revealing information about the artist's type is not compensated. A ROFR is a cure for this market failure. If the initial publisher obtains a ROFR, then, with the numbers used here, her return is -1 if the artist is unsuccessful but 1.5 if the artist is successful: on average, the publisher with a ROFR will make a profit. The artist, realizing that he won't receive a contract unless he gives the publisher a ROFR, gladly assigns this right to the publisher. This appears to be a fairly accurate portrayal of today's world of recording artists.

In this two period story there is a tension between *ex ante* and *ex post* efficiency, as with patents. Without the ROFR the publisher's expected profit from the book is negative, so a ROFR is *ex ante* efficient as it provides sufficient inducement to publish the book. However, if the book sells millions, then *ex post* social surplus might be larger if the next book by this author is with another publisher with a wider distribution network.

The above market failure (in the absence of a ROFR) is caused by too many buyers

vying to benefit from the initial buyer's investment, in the event that investment turns out to be profitable. The other extreme case – that of a monopsonist buyer – provides another reason for the grant of an ROFR. A monopsonist might use his market power today to extract a ROFR on future sales by the seller. Similarly, a monopolist seller may demand a meet-the-competition clause, which is the mirror-image of a ROFR with the roles of buyer and seller reversed, today in order to prevent entry by other sellers tomorrow. This is essentially what transpired when Coke and Pepsi granted NutraSweet a meet-the-competition clause for the supply of aspartame in the 1980's; at that time there was no other supplier of aspartame (as it was patented by NutraSweet).

Thus, the ROFR might provide an obvious cure to an actual market failure or might be a symptom of the special buyer's market power. While this is not the model we analyze, it does illustrate the economic value of this contracting mechanism. The model we analyze applies to real estate and some business ventures where the ROFR is prevalent but there are no market failures or monopsonists. Our analysis shows that in such settings it seldom makes sense for one party to grant the other party a ROFR. Residential real estate is a market in which the practice of granting a ROFR remains a puzzle to us. Landlords sometimes grant a ROFR to tenants who lease a house or apartment from them. If at a future date the landlord decides to sell the property, the ROFR entitles the tenant to buy at the best price others are willing to pay. The initial rental of the property provides obvious mutual gains to the landlord and tenant. This is a thick market in which it is easy for the landlord to find other renters. The leasing contract forbids the tenant from "investing" in (i.e., making improvements to) the property. Hence, none of the reasons for a ROFR discussed in the preceding paragraphs apply. A ROFR seems particularly detrimental to the landlord because a tenant who is interested in exercising her ROFR has no incentive to show the property in its best condition to other potential buyers.

Regardless of the possible reason for granting a ROFR, it is clear that this is a benefit that must not be conferred lightly by the seller.

6 Appendix

6.1 Proofs of section 3 results

Proof of Proposition 3: Let $\hat{V}(x,y,z) \equiv E[V_n|X_n = x, Z_{1,n-1} = y, X_{n+1} = z]$. Without a ROFR the regular buyers as a whole make

$$E[\Pi_{\overline{ROFR}}] = E\left[\left(\hat{V}(Z_{1,n}, Z_{2,n}, X_{n+1}) - \hat{b}(Z_{2,n} \vee X_{n+1})\right)1_{\{X_{n+1}<Z_{1,n}\}}\right]$$

where $\hat{V}(Z_{1,n}, Z_{2,n}, X_{n+1}) - \hat{b}(Z_{2,n} \vee X_{n+1})$ is the difference between the expected value of the object to the regular buyer with the largest signal and the price that this buyer must pay the seller. When the special buyer has a ROFR, the regular buyers' expected profit is

$$E[\Pi_{ROFR}] = E\left[\left(\hat{V}(Z_{1,n}, Z_{2,n}, X_{n+1}) - b_*(Z_{2,n})\right)1_{\{X_{n+1}<h_*(Z_{2,n})\}}\right].$$

We show that $E[\Pi_{\overline{ROFR}}] > E[\Pi_{ROFR}]$. To this end, define

$$\Lambda(z_1,z_2,u) \equiv E\left[\left\{\hat{V}(z_1,z_2,X_{n+1}) - E\left[V_n\middle|X_n = z_2, Z_{1,n-1} = z_2, X_{n+1} \le u\right]\right\}1_{\{X_{n+1}<u\}}\right].$$

Clearly,

$$E[\Pi_{\overline{ROFR}}] > E\left[\left(\hat{V}(Z_{1,n}, Z_{2,n}, X_{n+1}) - \hat{b}(Z_{2,n})\right)1_{\{X_{n+1}<Z_{2,n}\}}\right] = \Lambda(Z_{1,n}, Z_{2,n}, Z_{2,n}). \tag{15}$$

To simplify $\Lambda(z_1,z_2,u)$ note that

$$\begin{aligned} E\left[V_n\middle|X_n = z_2, Z_{1,n-1} = z_2, X_{n+1} \le u\right] &= \int_0^u \hat{V}(z_2,z_2,x)\frac{dP\left(X_{n+1} \le x\middle|X_n = z_2, Z_{1,n-1} = z_2\right)}{P\left(X_{n+1} \le u\middle|X_n = z_2, Z_{1,n-1} = z_2\right)} \\ &= \int_0^u \hat{V}(z_2,z_2,x)dP\left(X_{n+1} \le x\middle|X_{n+1} \le u\right). \end{aligned}$$

The second equation uses the fact that the signals are independent. With this we see that $\Lambda(z_1,z_2,u)$ equals

$$\int_0^u \hat{V}(z_1,z_2,x)dP\left(X_{n+1} \le x\right) - \int_0^u \hat{V}(z_2,z_2,x)dP\left(X_{n+1} \le x\middle|X_{n+1} \le u\right)P(X_{n+1} \le u)$$

$$= \int_0^u \left[\hat{V}(z_1,z_2,x) - \hat{V}(z_2,z_2,x)\right]dP\left(X_{n+1} \le x\right).$$

By affiliation $\hat{V}(z_1,z_2,x) \ge \hat{V}(z_2,z_2,x)$. Therefore, $\Lambda(z_1,z_2,u)$ is an non-decreasing function of u for every z_1 and z_2.

To complete the proof, we note that $\hat{b}(x) = E\left[V_n \middle| X_n = x, Z_{1,n-1} = x, X_{n+1} \leq x\right]$ and equation (15) together with the definitions of $E[\Pi_{ROFR}]$ and $b_*(x)$ yields

$$E[\Pi_{\overline{ROFR}}] > \Lambda(Z_{1,n}, Z_{2,n}, Z_{2,n}) \geq \Lambda(Z_{1,n}, Z_{2,n}, h_*(Z_{2,n})) = E[\Pi_{ROFR}].$$

∎

Proof of Proposition 5: Let

$$z_0 \equiv \sup\{z \in [0, \overline{X}] \,|\, h_0(z) = 0\}.$$

As h_0 is non-decreasing, $h_0(z) = 0$ for all $z < z_0$ and $h_0(z) > 0$ for all $z > z_0$. Define

$$b_1(x) \equiv U(x, x, h_0(x)).$$

As h_0 is non-decreasing, affiliation implies that b_1 is strictly increasing. Consequently, b_1 must be continuous almost everywhere in $[0, \overline{X}]$.

The proof follows directly from three key lemmas for the equilibrium increasing/non-decreasing strategy pair (b_0, h_0).

Lemma 2 *At every point $x > z_0$ for which the function b_1 is continuous, we have $b_0(x) = b_1(x)$.*

Proof of Lemma 2: Consider an $x > z_0$ (therefore $h_0(x) > 0$) at which b_1 is continuous. Suppose that $b_0(x) > b_1(x)$. Then, by continuity of b_1, there exists $\epsilon > 0$ such that $b_0(x) > b_1(x+\epsilon)$. Assume that $X_n = y$, where $x < y < x+\epsilon$; hence $b_0(y) > b_0(x) > b_1(y)$. If the highest bid from the first $n-1$ buyers $P \equiv \max_{1 \leq i \leq n-1} b_0(X_i)$ is greater than $b_0(y)$, then buyer n does not obtain the object with a bid of $b_0(y)$ or $b_1(y)$. Likewise, if $P \leq b_1(y)$ and $X_{n+1} \leq h\left(b_0^{-1}(P)\right)$, then buyer n receives the object whether he bids $b_0(y)$ or $b_1(y)$ and in each instance pays price P.

On the other hand, if $P \in (b_1(y), b_0(y)]$ and $X_{n+1} \leq h_0\left(b_0^{-1}(P)\right)$, then buyer n obtains the object only when he bids $b_0(y)$. In this case the expected value of the object to buyer n is

$$\begin{aligned} E\left[V_n \middle| X_n = y, Z_{1,n-1} = b_0^{-1}(P), X_{n+1} \leq h_0\left(b_0^{-1}(P)\right)\right] &\leq E\left[V_n \middle| X_n = y, Z_{1,n-1} = y, X_{n+1} \leq h_0(y)\right] \\ &= b_1(y) < P, \end{aligned}$$

where we use affiliation together with the fact that $y \geq b_0^{-1}(P)$ and h_0 is a non-decreasing function. As $h_0(x) > 0$, we know that the event $\{X_{n+1} \leq h_0\left(b_0^{-1}(P)\right)\} \cap \{P \in (b_1(y), b_0(y))\}$ has positive probability. Lastly, we note that $\text{Prob}[X_n \in (x, x+\epsilon)] > 0$. Clearly, buyer n would strictly refer to bid $b_1(y)$ rather than $b_0(y)$. Therefore, we must have $b_0(x) \leq b_1(x)$.

A symmetric argument establishes that $b_0(x) \geq b_1(x)$. Thus, $b_0(x) = b_1(x)$ at any point $x > z_0$ where b_1 is continuous. △

At points of discontinuity for b_1 a best-response function to h_0 may differ from b_1. If x is such a point, then $b_0(x') < b_1(x^-)$, $\forall x' < x$, and $b_0(x') > b_1(x^+)$, $\forall x' > x$. As the set of discontinuities of (the increasing function) b_1 has probability measure zero, the differences on this discontinuity set have no effect on the outcome of the bidding. Any symmetric best response $b_0(x)$ to $h_0(x)$ must equal $b_1(x)$ for almost every x for which $h_0(x) > 0$.

Thus, b_0 is specified by h_0 for $x > z_0$. The next lemma considers b_0 for $x < z_0$ and shows that h_0 and h_* have identical zeroes (i.e., $z_0 = \underline{z}$).

Recall that $\underline{z} \equiv \sup\{z \in [0, \overline{X}] \,|\, h_*(z) = 0\}$. By A1, $h_*(z) = 0$ for all $z < \underline{z}$ and $h_*(z) > 0$ for all $z > \underline{z}$. By Proposition 4 we know that (b_*, h_*) form an equilibrium.

Lemma 3 *(i)* $b_0(x) \leq W(0, x)$, $\forall x < \underline{z}$. *(ii)* $z_0 = \underline{z}$.

Proof of Lemma 3: (i) Suppose instead that $b_0(x) > W(0, x)$, for some $x < \underline{z}$. Because $W(x, z)$ is continuous in both of its arguments and b_0 is a strictly increasing function, there exists an interval $I \subset [0, \underline{z})$ such that for all $z \in I$, $b_0(z) > W(0, z)$. As noted previously in (3), in a symmetric Nash equilibrium with bid function b_0 the special buyer's cutoff function must be

$$h_0(z) \;=\; \min\left\{u \in [0, \overline{X}] \;|\; W(u, z) - b_0(z) \geq 0\right\}. \tag{16}$$

From the fact that $b_0(z) > W(0, z)$ for all $z \in I$ we know two things: (a) $h_0(z) > 0$ and (b) $W(h_0(z), z) = b_0(z)$ for all $z \in I$.[13] Lemma 2 and (a) imply that if b_0 is to be a best response to h_0 then $b_0(z) \;=\; U(z, z, h_0(z))$ for almost all $z \in I$. Recalling that $h_*(z) = 0$ for all $z < \underline{z}$, we see that $W(y, z) > U(z, z, y)$ for all $y > 0$, where strict inequality follows from A2. Thus, $W(h_0(z), z) > U(z, z, h_0(z)) = b_0(z)$ for almost all $z \in I$. But this contradicts (b). Thus, $b_0(x) \leq W(0, x)$, $\forall x < \underline{z}$.

(ii) By (i), $W(0, z) - b_0(z) \geq 0$ for all $z < \underline{z}$. Thus, (16) implies that $h_0(z) = 0$ for all $z < \underline{z}$. Next, suppose that $h_0(z') = 0$ for some $z' > \underline{z}$. As h_0 is non-decreasing, $h_0(z) = 0$, $\forall z \in (\underline{z}, z']$. Thus, by (16), $W(0, z) \geq b_0(z)$, $\forall z \in (\underline{z}, z']$. From the definition of $\underline{z}$, we know that $W(0, z) < U(z, z, 0)$, $\forall z \in (\underline{z}, z']$. Set $b_1(z) = b_0(z)$ for $z < \underline{z}$ and $= U(z, z, h_0(z))$ for $z \geq \underline{z}$. It is easy to see that b_1 leads to a higher expected payoff b. Therefore, we have a contradiction. $\triangle$

We have established that $h_0(z) = h_*(z)$ for all $z < \underline{z}$. The next lemma implies that $h_0(z) = h_*(z)$ for all $z \geq \underline{z}$.

Lemma 4 *Let* $b_1(x) = U(x, x, h_0(x))$. *The special buyer's best-response cutoff function, denoted* h_1, *to* b_1 *has the following properties:*

1. $h_1(z) \in (h_0(z), h_*(z)]$ *at any point* z *where* $h_0(z) < h_*(z)$, *and*
2. $h_1(z) \in [h_*(z), h_0(z))$ *at any point* z *where* $h_0(z) > h_*(z)$.

[13] The continuity of $W(\cdot, z)$ is also used to conclude (b).

Proof of Lemma 4: If the first n buyers are using the bid function b_1, then when $Z_{2,n} = z$ and $X_{n+1} = x$ buyer $n+1$ makes $W(x,z) - b_1(z)$ in profit, if she decides to buy the object. Therefore, by (3), her optimal response to b_1 is the cutoff function

$$h_1(z) \equiv \min\{u : W(u,z) - b_1(z) \geq 0\} = \min\{u : \phi(u,z,h_0(z)) \geq 0\}.$$

If $h_0(z) < h_*(z)$ at z, then, by the definitions of b_* and b_1, $b_1(z) \leq b_*(z)$. This implies that $h_1(z) \leq h_*(z)$. However, $h_1(z)$ must be strictly greater than $h_0(z)$, because with $h_0(z) < h_*(z)$, $W(h_0(z),z) - U(z,z,h_0(z)) = \phi(h_0(z),z,h_0(z)) < 0$, where the strict inequality follows from A2. If, on the other hand, $h_0(z) > h_*(z)$ at z, then $b_1(z) \geq b_*(z)$, which implies that $h_1(z) \geq h_*(z)$. However, $h_1(z)$ must be strictly less than $h_0(z)$. This holds because, with $h_0(z) > h_*(z)$, assumption A2 implies that $W(h_0(z),z) - b_1(z) = \phi(h_0(z),z,h_0(z)) > 0$. △

To complete the proof of Proposition 5 observe that if (b_0, h_0) forms a symmetric Nash equilibrium, then for $x \leq \underline{z}$, $b_0(x) \leq W(0,x)$ and $h_0(x) = 0$.

Next consider $x > \underline{z}$. We know that $h_0(x) > 0$ in this range. Therefore, by Lemma 2, $b_0(x) = U(x,x,h_0(x))$ almost everywhere. If (b_0, h_0) is to form a Nash equilibrium, then Lemma 4 implies that $h_0(x)$ must equal $h_*(x)$. Thus, for $x > \underline{z}$, $b_0(x) = b_*(x)$, almost everywhere. ∎

6.2 Proofs of section 4 results

The following lemma is useful:

Lemma 5 *When the signals are independent and $V_i = (1-a)X_i + aV$, $\forall i$,*

$$\begin{aligned} E[R_2 - R_1] &= aE\left[\left\{V - E\left[V\middle|X_{n+1}, Z_{2,n}, Z_{1,n} = Z_{2,n} \vee X_{n+1}\right]\right\} 1_{II \cup III}\right] \\ &\quad - (1-a)E\left[(Z_{2,n} - X_{n+1})1_{III}\right], \end{aligned}$$

where sets II and III are defined as in Section 4.3.

Proof of Lemma 5: Observe that

$$\begin{aligned} \hat{b}(x) &= (1-a)x + aE\left[V\middle|X_{n+1} = x, Z_{1,n} = x\right], \quad \text{and} \\ b_*(x) &= (1-a)x + aE\left[V\middle|X_n = x, Z_{1,n-1} = x, X_{n+1} \leq h_*(x)\right]. \end{aligned}$$

Rewriting (10), we have

$$\begin{aligned} E[R_2 - R_1] &= E\left[\{V_{n+1} - \hat{b}(X_{n+1})\}1_{II}\right] \\ &+ E\left[\{V_{n+1} - \hat{b}(Z_{2,n})\}1_{III}\right] + E\left[\{b_*(Z_{2,n}) - \hat{b}(Z_{2,n})\}1_{IV}\right]. \end{aligned} \tag{17}$$

The first term on the right-hand side above simplifies to

$$aE\left[\left\{V - E\left[V\middle|X_{n+1}, Z_{1,n} = X_{n+1}\right]\right\}1_{II}\right].$$

The second term in (17) can be written as

$$(1-a)E\left[(X_{n+1} - Z_{2,n})1_{III}\right] + aE[V1_{III}] - aE\left[E\left[V\middle|Z_{2,n}, Z_{1,n+1} = Z_{2,n}\right]1_{III}\right].$$

The last term in (17) simplifies to

$$aE\left[E\left[V\middle|Z_{2,n}, Z_{1,n} = Z_{2,n}, IV\right]1_{IV}\right] - aE\left[E\left[V\middle|Z_{2,n}, Z_{1,n+1} = Z_{2,n}\right]1_{IV}\right].$$

Next, we note that

$$\begin{aligned}
&E\left[E\left[V\middle|Z_{2,n}, Z_{1,n+1} = Z_{2,n}\right]1_{III}\right] + E\left[E\left[V\middle|Z_{2,n}, Z_{1,n+1} = Z_{2,n}\right]1_{IV}\right] \\
&= E\left[E\left[V\middle|Z_{2,n}, Z_{1,n+1} = Z_{2,n}\right]\{1_{III} + 1_{IV}\}\right] \\
&= E\left[E\left[V\middle|Z_{2,n}, Z_{1,n} = Z_{2,n}, III \cup IV\right]\{1_{III} + 1_{IV}\}\right] \\
&= E\left[E\left[E\left[V\middle|Z_{2,n}, Z_{1,n} = Z_{2,n}, III \cup IV\right]\{1_{III} + 1_{IV}\}\middle|Z_{2,n}\right]\right] \\
&= E\left[E\left[V\middle|Z_{2,n}, Z_{1,n} = Z_{2,n}, III \cup IV\right]P(III \cup IV|Z_{2,n})\right] \\
&= E\left[E\left[V\{1_{III} + 1_{IV}\}\middle|Z_{2,n}, Z_{1,n} = Z_{2,n}\right]\right].
\end{aligned}$$

The last equality uses the independence of $Z_{1,n}$ and X_{n+1}. Similarly,

$$\begin{aligned}
E\left[E\left[V\middle|Z_{2,n}, Z_{1,n} = Z_{2,n}, IV\right]1_{IV}\right] &= E\left[E\left[V\middle|Z_{2,n}, Z_{1,n} = Z_{2,n}, IV\right]P(IV|Z_{2,n})\right] \\
&= E\left[E\left[V1_{IV}\middle|Z_{2,n}, Z_{1,n} = Z_{2,n}\right]\right].
\end{aligned}$$

The last equality uses the fact that $Z_{1,n}$ and X_{n+1} are independent.

Putting this all together, we see that in summing the latter two terms in (17) the factors multiplied by 1_{IV} cancel out, reducing this sum to

$$-(1-a)E\left[(Z_{2,n} - X_{n+1})1_{III}\right] + aE\left[V1_{III} - E\left[V1_{III}\middle|Z_{2,n}, Z_{1,n} = Z_{2,n}\right]\right].$$

We note that by the independence of the X's and the fact that set III depends only on X_{n+1} and $Z_{2,n}$

$$E\left[E\left[V1_{III}\middle|Z_{2,n}, Z_{1,n} = Z_{2,n}\right]\right] = E\left[E\left[V\middle|X_{n+1}, Z_{2,n}, Z_{1,n} = Z_{2,n}\right]1_{III}\right].$$

Therefore, the sum of the latter two terms in (17) equals

$$-(1-a)E\left[(Z_{2,n} - X_{n+1})1_{III}\right] + aE\left[\left\{V - E\left[V\middle|X_{n+1}, Z_{2,n}, Z_{1,n} = Z_{2,n}\right]\right\}1_{III}\right].$$

Finally, using the fact that the set $\{X_{n+1} = Z_{1,n}\} = \{X_{n+1} = Z_{1,n}\} \cap II$ and that, conditioned on the value of X_{n+1} and the fact that $Z_{2,n} \leq X_{n+1}$, the values of $Z_{2,n}$ and $Z_{1,n}$ are independent, we have

$$E\left[E\left[V\middle|X_{n+1}, Z_{1,n} = X_{n+1}\right]1_{II}\right] \;=\; E\left[E\left[V\middle|X_{n+1}, Z_{2,n}, Z_{1,n} = X_{n+1}\right]1_{II}\right].$$

Putting all of this together with (17) yields

$$\begin{aligned} E[R_2 - R_1] \;&=\; aE\left[\left\{V - E\left[V\middle|X_{n+1}, Z_{2,n}, Z_{1,n} = X_{n+1}\right]\right\}1_{II}\right] - (1-a)E\left[(Z_{2,n} - X_{n+1})1_{III}\right] \\ &+\; aE\left[\left\{V - E\left[V\middle|X_{n+1}, Z_{2,n}, Z_{1,n} = Z_{2,n}\right]\right\}1_{III}\right]. \end{aligned}$$

Combining like terms above completes the proof. △

Proof of Equation (14): Below we make use of two facts: First, a uniform random variable on $[0,1]$ conditioned on being $\leq$ (or $\geq$) z is a uniform random variable on $[0,z]$ (or $[z,1]$). Second, $Z_{1,n}$ is conditionally independent of the $Z_{k,n}$'s for $k \geq 3$, given $Z_{2,n}$.

From Lemma 5, we know that

$$E\left[(R_2 - R_1)1_{II}\right] \;=\; aE\left[\left\{V - E\left[V\middle|X_{n+1}, Z_{2,n}, Z_{1,n} = X_{n+1}\right]\right\}1_{II}\right] \tag{18}$$

and

$$\begin{aligned} E\left[(R_2 - R_1)1_{III\cup IV}\right] \;&=\; aE\left[\left\{V - E\left[V\middle|X_{n+1}, Z_{2,n}, Z_{1,n} = Z_{2,n}\right]\right\}1_{III}\right] \\ &\quad - (1-a)E\left[(Z_{2,n} - X_{n+1})1_{III}\right]. \end{aligned} \tag{19}$$

Focussing first on set II, we note that

$$\begin{aligned} &E\left[\left\{V - E\left[V\middle|X_{n+1}, Z_{2,n}, Z_{1,n} = X_{n+1}\right]\right\}1_{II}\right] \\ &\quad=\; E\left[\left\{E\left[V\middle|X_{n+1}, Z_{2,n}\right] - E\left[V\middle|X_{n+1}, Z_{2,n}, Z_{1,n} = X_{n+1}\right]\right\}1_{II}\right]. \end{aligned}$$

Because V is simply the average of the signals and the signals are independent

$$E\left[V\middle|X_{n+1}, Z_{2,n}\right] \;=\; \frac{1}{n+1}\left(X_{n+1} + E[Z_{1,n}|X_{n+1}, Z_{2,n}] + \sum_{k=2}^{n} E[Z_{k,n}|Z_{2,n}]\right),$$

and

$$E\left[V\middle|X_{n+1}, Z_{2,n}, Z_{1,n} = X_{n+1}\right] \;=\; \frac{1}{n+1}\left(X_{n+1} + X_{n+1} + \sum_{k=2}^{n} E[Z_{k,n}|Z_{2,n}]\right).$$

Therefore, equation (18) reduces to

$$\begin{aligned} E\left[(R_2 - R_1)1_{II}\right] &= \frac{a}{n+1} E\left[\{E[Z_{1,n}|X_{n+1}, Z_{2,n}] - X_{n+1}\}1_{II}\right] \\ &= \frac{a}{n+1} E\left[\left\{\frac{1+X_{n+1}}{2} - X_{n+1}\right\}1_{II}\right] \\ &= \frac{a}{2(n+1)} E\left[(1 - X_{n+1})1_{II}\right]. \end{aligned}$$

Conditioned on the value of $Z_{2,n}$ and the set II, X_{n+1} is distributed like the smaller of two independent uniform r.v.'s on the interval $[Z_{2,n}, 1]$. Conditioned on $Z_{2,n}$, $Z_{1,n} \sim$ Uniform$[Z_{2,n}, 1]$. Given the value of $Z_{2,n}$, the probability that II occurs equals

$$P(X_{n+1} \geq Z_{2,n}|Z_{2,n})P(X_{n+1} < Z_{1,n}|Z_{2,n}, X_{n+1} \geq Z_{2,n}) \;=\; (1 - Z_{2,n})\frac{1}{2}.$$

With this we have

$$\begin{aligned} E\left[(R_2 - R_1)1_{II}\right] &= \frac{a}{2(n+1)} E\left[E\left[1 - X_{n+1}\middle| Z_{2,n}, II\right] P(II|Z_{2,n})\right] \\ &= \frac{a}{2(n+1)} E\left[\left(1 - \frac{2}{3}Z_{2,n} - \frac{1}{3}\right)(1 - Z_{2,n})\frac{1}{2}\right] \\ &= \frac{a}{6(n+1)} E\left[(1 - Z_{2,n})^2\right] \\ &= \frac{a}{(n+1)^2(n+2)}. \end{aligned} \tag{20}$$

Using a similar line of reasoning:

$$\begin{aligned} &E\left[\left\{V - E\left[V\middle|X_{n+1}, Z_{2,n}, Z_{1,n} = Z_{2,n}\right]\right\}1_{III}\right] \\ &= E\left[\left\{E\left[V\middle|X_{n+1}, Z_{2,n}\right] - E\left[V\middle|X_{n+1}, Z_{2,n}, Z_{1,n} = Z_{2,n}\right]\right\}1_{III}\right] \\ &= \frac{1}{n+1} E\left[\left\{X_{n+1} + E[Z_{1,n}|X_{n+1}, Z_{2,n}] + \sum_{k=2}^{n} E[Z_{k,n}|Z_{2,n}]\right. \right. \\ &\qquad \left. \left. - \left(X_{n+1} + Z_{2,n} + \sum_{k=2}^{n} E[Z_{k,n}|Z_{2,n}]\right)\right\}1_{III}\right] \\ &= \frac{1}{n+1} E\left[\{E[Z_{1,n}|X_{n+1}, Z_{2,n}] - Z_{2,n}\}1_{III}\right] \;=\; \frac{1}{n+1} E\left[\{Z_{1,n} - Z_{2,n}\}1_{III}\right]. \end{aligned}$$

Thus, equation (19) simplifies to

$$E\left[(R_2 - R_1)1_{III \cup IV}\right] \;=\; \frac{a}{n+1} E\left[\{Z_{1,n} - Z_{2,n}\}1_{III}\right] - (1-a)E\left[(Z_{2,n} - X_{n+1})1_{III}\right]$$

Given that the X_i's are uniform on $[0, 1]$ and independent,

$$\begin{aligned} E\left[(Z_{2,n} - X_{n+1})1_{III}|Z_{2,n}\right] &= \frac{1}{2}\left(Z_{2,n} \wedge \underline{z}\right)^2, \text{ and} \\ E\left[(Z_{1,n} - Z_{2,n})1_{III}|Z_{2,n}\right] &= \frac{1 - Z_{2,n}}{2}(Z_{2,n} \wedge \underline{z}), \end{aligned}$$

where $\underline{z} = a/[1 + (2n+1)(1-a)]$ and "$\wedge$" indicates minimum. Thus,

$$\begin{aligned} E\left[(R_2 - R_1)1_{III}\right] &= \frac{a}{2(n+1)} E\left[(1 - Z_{2,n})(Z_{2,n} \wedge \underline{z})\right] - \frac{1-a}{2} E\left[(Z_{2,n} \wedge \underline{z})^2\right] \\ &= \frac{a}{(n+1)^2}\left(\underline{z} - \frac{n+1}{2}\underline{z}^n + (n-1)\underline{z}^{n+1} - \frac{n(n-1)}{2(n+2)}\underline{z}^{n+2}\right) \\ &\quad - (1-a)\left(\frac{1}{2}\underline{z}^2 - \frac{n}{n+1}\underline{z}^{n+1} + \frac{n-1}{n+2}\underline{z}^{n+2}\right) \end{aligned} \tag{21}$$

Adding (20) and (21) we get (14). ∎

Proof of Proposition 8: Using Lemma 5, we can easily show that the net benefit to the pair in this case is positive. Instead, we prove the stronger result that the net benefit to the pair is zero on the sets I and IV, and positive on II and III.

If $h_*(z) > 0$, then equation (11) yields

$$\begin{aligned} z - h_*(z) &= \frac{a}{1-a}\left(E\left[g(Z_{1,n+1}, Z_{2,n+1})\middle| X_{n+1} = h_*(z), Z_{2,n} = z\right] - g(z,z)\right) \\ &= \frac{a}{1-a}\left(E\left[g(X,z)\middle| X \geq z\right] - g(z,z)\right) \end{aligned}$$

The equations above use the independence of signals, and the fact that $h_*(z) \leq z$ and that $Z_{1,n+1} = Z_{1,n}$ and $Z_{2,n+1} = Z_{2,n}$ if $X_{n+1} \leq Z_{2,n}$. Rearranging terms, we have

$$h_*(z) = \max\left\{z - \frac{a}{1-a} E\left[g(X,z) - g(z,z)|X \geq z\right], 0\right\}. \tag{22}$$

We have seen that the net benefit from ROFR trade equals zero on set I and is non-negative on set II. Next, we show that if $g(z_1, z_2)$ depends on z_1 on a set of positive measure, then the net benefit on II is positive. Observe that on II

$$\begin{aligned} R_2 &= V_{n+1} = (1-a)X_{n+1} + ag(Z_{1,n+1}, Z_{2,n+1}), \text{ and} \\ R_1 &= \hat{b}(X_{n+1}) = (1-a)X_{n+1} + ag(X_{n+1}, X_{n+1}). \end{aligned}$$

Thus,

$$\begin{aligned} E[(R_2 - R_1)1_{II}] &= aE[\{g(Z_{1,n+1}, Z_{2,n+1}) - g(X_{n+1}, X_{n+1})\}1_{II}] \\ &= aE[\{g(Z_{1,n}, X_{n+1}) - g(X_{n+1}, X_{n+1})1_{\{Z_{1,n} > X_{n+1} \geq Z_{2,n}\}}\}] > 0. \end{aligned}$$

On III, $X_{n+1} \in [h_*(Z_{2,n}), Z_{2,n})$. Thus

$$\begin{aligned} R_2 &= V_{n+1} = (1-a)X_{n+1} + ag(Z_{1,n+1}, Z_{2,n+1}), \text{ and} \\ R_1 &= \hat{b}(Z_{2,n}) = (1-a)Z_{2,n} + ag(Z_{2,n}, Z_{2,n}). \end{aligned}$$

As $X_{n+1} < Z_{2,n}$, we have $Z_{1,n+1} = Z_{1,n}$, $Z_{2,n+1} = Z_{2,n}$. From (22) we have

$$aE\left[g(Z_{1,n}, Z_{2,n}) - g(Z_{2,n}, Z_{2,n})|Z_{2,n}\right] \geq (1-a)\left(Z_{2,n} - h_*(Z_{2,n})\right).$$

From this we see that

$$\begin{aligned} E[(R_2 - R_1)1_{III}] &= (1-a)E\left[(X_{n+1} - Z_{2,n})1_{III}\right] + aE\left[(g(Z_{1,n}, Z_{1,n}) - g(Z_{2,n}, Z_{2,n}))1_{III}\right] \\ &\geq (1-a)E\left[(X_{n+1} - h_*(Z_{2,n}))1_{III}\right] > 0, \end{aligned}$$

when $P(III) > 0$, and $= 0$ otherwise. We note that $P(III) = 0$ only when $g(z_1, z_2)$ does not depend on z_1 almost everywhere. In that case $h_*(z) = z$ for all z.

On set IV, the special buyer wins neither auction. Thus, $R_2 = b_*(Z_{2,n})$ and $R_1 = \hat{b}(Z_{2,n})$. It is easy to see that $b_*(z) = \hat{b}(z) = ag(z,z) + (1-a)z, \ \forall z$. Thus, the net benefit is zero on this set. ∎

Proof of Proposition 9: Because V does not depend on $Z_{1,n+1}$, on the sets II and III we have

$$E\left[V \middle| X_{n+1}, Z_{2,n}, Z_{1,n} = Z_{2,n} \vee X_{n+1}\right] = E\left[V \middle| X_{n+1}, Z_{2,n}\right].$$

Thus, by Lemma 5

$$\begin{aligned} E[R_2 - R_1] &= aE\left[\left\{V - E\left[V \middle| X_{n+1}, Z_{2,n}\right]\right\} 1_{II \cup III}\right] - (1-a)E\left[(Z_{2,n} - X_{n+1})1_{III}\right] \\ &= -(1-a)E\left[(Z_{2,n} - X_{n+1})1_{III}\right] \leq 0, \end{aligned}$$

completing the first part of the proof.

Clearly, when $h_*(z) \equiv z$, then $P(III) = 0$, which from the above analysis implies that $E[R_2 - R_1] = 0$. If, on the other hand, $h_*(z) < z$ on some set of positive F-measure, then $P(III) > 0$ and $E[R_2 - R_1] < 0$.

If $h_*(z) = z$, then by the definition of h_* the function $\phi(z,z,z) = 0$. By (4) this implies that

$$\begin{aligned} &E\left[g(z, Z_{3,n+1}, \ldots, Z_{n+1,n+1}) \middle| Z_{2,n} = z, X_{n+1} = z\right] - \\ &\quad E\left[g(z, Z_{3,n+1}, \ldots, Z_{n+1,n+1}) \middle| Z_{2,n} = z, X_{n+1} \leq z\right] = 0. \end{aligned} \tag{23}$$

But (23) implies that for each z, $g(z, \cdot, \ldots, \cdot)$ is constant almost everywhere. Thus, if g does not depend solely on its first argument almost everywhere, then $h_*(z) < z$ for a set of positive F-measure. ∎

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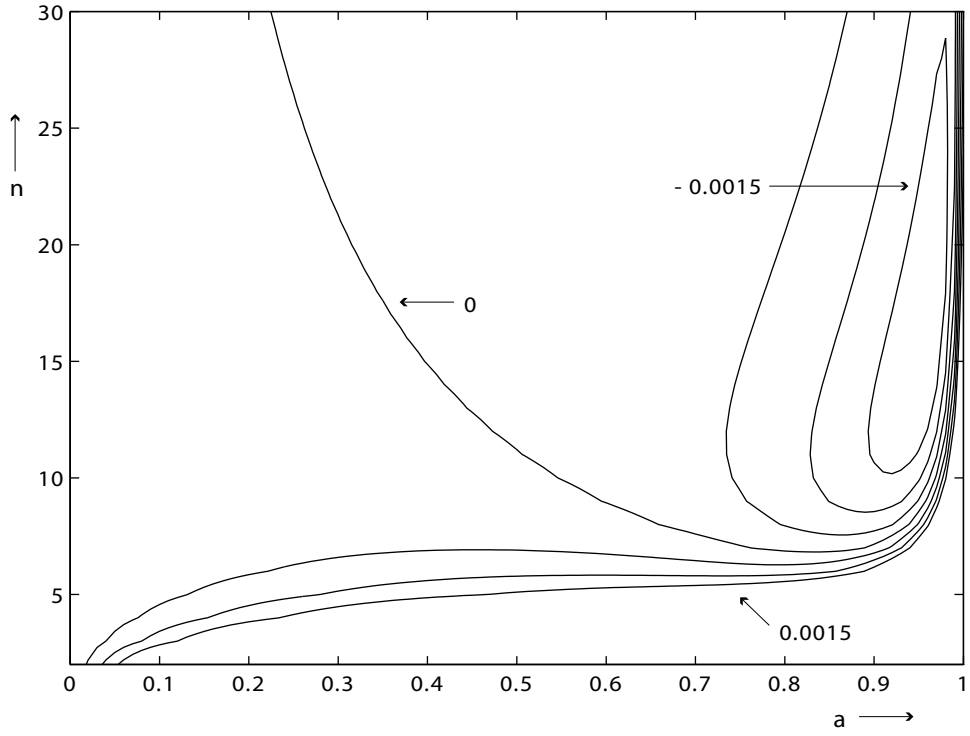

Figure 1

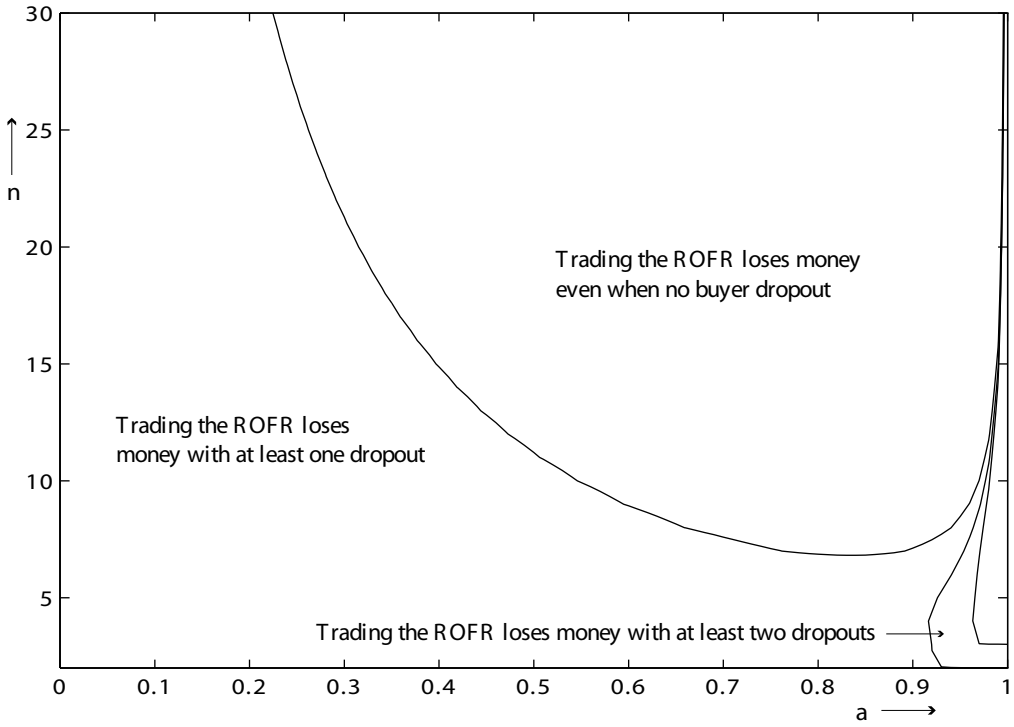
30
25
20
15
10
5
n
Trading the ROFR loses money
even when no buyer dropout
Trading the ROFR loses
money with at least one dropout
Trading the ROFR loses money with at least two dropouts
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
a

Figure 2

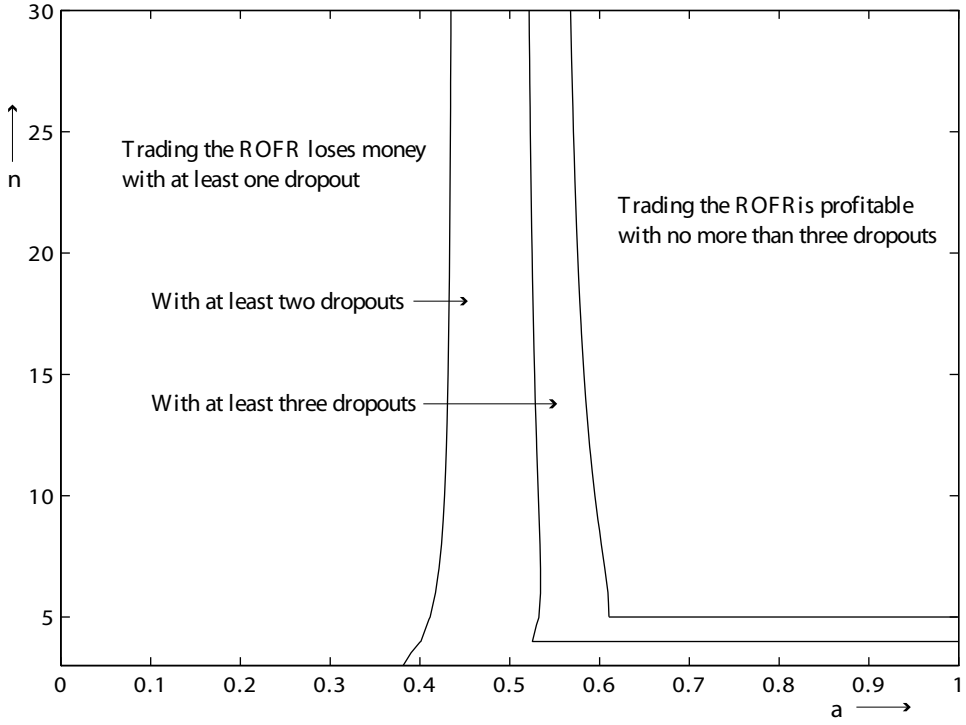
30
25
20
15
10
5
n
Trading the ROFR loses money
with at least one dropout
Trading the ROFR is profitable
with no more than three dropouts
With at least two dropouts
With at least three dropouts
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
a

Figure 3

A note on the suboptimality of right-of-first-refusal clauses

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Abstract

We show that, under independent private values, no mechanism that contains a right-of-first-refusal clause can maximize the sum of the utilities of the seller and the right-holder.

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1 Introduction

A right of first refusal (ROFR) is a contract clause that provides its holder with the right to purchase an object at the highest price the seller is able to get from another buyer.[1] In essence, the clause awards a specific buyer the right to act after all her rivals have participated in some form of bidding competition.[2] ROFR clauses are broadly used in share transactions, lease contracts, partnerships and professional sports, among many other cases (see Walker, 1999, for more examples). In addition, a context where an ROFR arises naturally is that where the seller and the favored buyer are two firms in the same conglomerate.

One possible justification for introducing such a clause is that it could result in a higher joint expected surplus for the seller and the right-holder in the bidding process –while generating a negative externality on all other parties to the auction, since it creates an allocative distortion. For instance, Choi (2003) shows that adding an ROFR clause to any of the four most usual auctions (English, Dutch, first- and second-price) results in a higher joint expected utility for the seller and the favored bidder if there is only one unfavored rival. Along the same lines, Burguet and Perry (2005) study the first-price auction and conclude that, if the seller auctions off an ROFR and then conducts the auction with a favored bidder she will receive, under some conditions, a higher expected price than she would by using a standard first-price auction. However, Bikhchandani et al. (2005) examine the ROFR in the context of a symmetric sealed-bid second-price auction and find that under private values, with at least three bidders, the ROFR generates an increase in the expected surplus of the favored buyer that exactly equals the loss to the seller. With interdependent values, their joint surplus may rise or fall.

In this note, we complement those results. We show that, under independent private values, no mechanism that includes an ROFR clause can maximize the joint expected surplus of the seller and the right-holder. Adding such a clause to any given auction format, then, is jointly suboptimal for the two parties involved.

2 The suboptimality result

The owner of a single, indivisible object is selling it through an auction. For simplicity, we assume the seller attaches no value to the object. There are $N \geq 2$ risk-neutral bidders. Bidder i's valuation for the object, v_i, is distributed according to a c.d.f. F_i with support on the interval $[\underline{v}, \overline{v}]$ and a density f_i that is positive and bounded on the whole support. Bidders' valuations are independent.

We want to characterize a selling mechanism that maximizes the sum of the expected utilities of the seller and a specific buyer. Without loss of generality, we assume that the favored buyer is bidder 1. Our problem is a slight modification of the standard optimal auction problem

[1] All our results are valid as well in the case of procurement auctions, where an ROFR is usually referred to as a meet-the-competition clause. For ease of exposition, however, in this note we will stick to the case of a seller favoring a specific potential buyer.

[2] We present here the simplest and most frequently used ROFR. For other possible versions of the clause, see Walker (1999) and Grosskopf and Roth (forthcoming).

with independent private values.[3] We solve it following the usual steps in the literature. Let $H_i(v_1, ..., v_N)$ ($P_i(v_1, ..., v_N)$) be the probability that bidder i gets the object (respectively, the price bidder i has to pay to the seller) if bidder valuations are given by $(v_1, ..., v_N)$. In addition, let $h_i(v_i)$ ($p_i(v_i)$) be the expected probability that bidder i gets the object (respectively, the expected price she pays) when her valuation is v_i, and the valuations of all other bidders are unknown.

Bidder i's expected utility when her valuation is v_i and she announces that it is v_i' is

$$\widetilde{U}_i(v_i, v_i') = h_i(v_i')v_i - p_i(v_i').$$

Besides, let

$$U_i(v_i) = \widetilde{U}_i(v_i, v_i) = h_i(v_i)v_i - p_i(v_i)$$

Then, our problem is[4]

$$\max_{\{H_i(.),P_i(.)\}_{i=1}^N} \sum_{i=1}^N \int_{\underline{v}}^{\overline{v}} p_i(v_i)f_i(v_i)dv_i + \int_{\underline{v}}^{\overline{v}} U_1(v_1)f_1(v_1)dv_1$$

subject to the standard incentive compatibility and participation constraints

$$\begin{aligned} U_i(v_i) &\geq \widetilde{U}_i(v_i, v_i') \quad \text{for all } i, \text{ for all } v_i, v_i' \\ U_i(v_i) &\geq 0 \qquad\qquad\qquad\qquad \text{for all } i, \text{ for all } v_i \end{aligned}$$

Let $\widetilde{v}_i(v_i)$ be the valuation that bidder i announces optimally when her true valuation is v_i. Clearly, by incentive compatibility, it has to be true that $\widetilde{v}_i(v_i) = v_i$ and $U_i(v_i) = \widetilde{U}_i(v_i, \widetilde{v}_i(v_i))$. The envelope theorem then implies that

$$U_i'(v_i) = \frac{\partial}{\partial v_i}\widetilde{U}_i(v_i, \widetilde{v}_i(v_i)) = h_i(v_i).$$

Therefore, it follows that $U_i(v_i) = \int_{\underline{v}}^{v_i} h_i(s)ds + U_i(\underline{v})$. Stated in a way that is more convenient to us in what follows, and noting that, in the solution to our problem, $U_i(\underline{v}) = 0$ for all $i > 1$,[5] we have

$$p_i(v_i) = h_i(v_i)v_i - \int_{\underline{v}}^{v_i} h_i(s)ds \tag{1}$$

for all $i > 1$. Replacing in the objective function yields

$$\int_{\underline{v}}^{\overline{v}} h_1(v_1)v_1f_1(v_1)dv_1 + \sum_{i\neq 1}\int_{\underline{v}}^{\overline{v}} \left[h_i(v_i)v_i - \int_{\underline{v}}^{v_i} h_i(s)ds\right] f_i(v_i)dv_i.$$

[3] See Myerson (1981) and Riley and Samuelson (1982).

[4] This can be thought as an extension to the N-bidder context of a particular case of the analysis in Naegelen and Mougeot (1998), when there is no consumer surplus, the shadow cost of public funds is zero and the domestic firm profit weight is one.

[5] Note that $U_1(\underline{v})$ may be zero or positive in a solution to our problem. Given that we are adding the expected utilities of the seller and bidder 1, how much the latter pays (as long as incentive compatibility holds) does not affect the objective function. There is a solution, however, where $U_1(\underline{v}) = 0$.

Integrating by parts, we have

$$\int_{\underline{v}}^{\overline{v}} h_1(v_1)v_1 f_1(v_1)dv_1 + \sum_{i\neq 1}\int_{\underline{v}}^{\overline{v}} h_i(v_i)J_i(v_i)f_i(v_i)dv_i$$

where $J_i(v_i) = v_i - \frac{1-F_i(v_i)}{f_i(v_i)}$ is bidder i's "virtual" valuation, which we assume increasing. Alternatively, we can express the objective function as

$$E_{v_1,...,v_N}\left[H_1(v_1,...,v_N)v_1 + \sum_{i\neq 1} H_i(v_1,...,v_N)J_i(v_i)\right]$$

The allocation rule that maximizes the joint expected surplus is then

$$H_1(v_1,...,v_N) = \begin{cases} 1 & \text{if } v_1 > \max_{i\neq 1} J_i(v_i) \\ 0 & \text{otherwise} \end{cases}$$

$$H_i(v_1,...,v_N) = \begin{cases} 1 & \text{if } J_i(v_i) > \max\{v_1, \max_{j\neq i} J_j(v_j)\} \\ 0 & \text{otherwise} \end{cases}$$

for $i > 1$. That is, the unfavored bidder with the highest virtual valuation gets the object unless her virtual valuation is lower than the favored bidder's *actual* valuation. In the latter case, the favored bidder gets the object. A standard revenue-maximizing auction would compare all bidders' virtual valuations and select the highest, while this mechanism replaces the favored bidder's virtual with her actual valuation in that comparison.[6] Since we are maximizing the sum of the expected utilities of the seller and the favored bidder, we can interpret v_1 as the seller's valuation. Thus, the allocation rule that follows is the same as in a revenue-maximizing auction when the seller has a positive (but not known in advance) valuation for the object.

Let us now turn to the ROFR clause. As mentioned above, the favored bidder has the right to match the highest price the seller is able to obtain from any of her rivals. Naturally, the right-holder will match whenever the highest standing price is lower than or equal to her valuation, and she will not match otherwise. Hence, if a mechanism including an ROFR maximized joint expected surplus, the price that the favored bidder would have to match to win would always be the highest among her rivals' virtual valuations. Therefore, we would necessarily have, for all $i > 1$, that $P_i(v_1,...,v_N) = J_i(v_i)$ whenever bidder i gets the object. Let $l_i(v_i) = E_{v_{-i}}\left[P_i(v_i, v_{-i}) \mid J_i(v_i) < \max\{v_1, \max_{j\neq i} J_j(v_j)\}\right]$ be the expected price that bidder i pays given that she does not get the object and her valuation is v_i. By incentive compatibility,

$$p_i(v_i) = h_i(v_i)J_i(v_i) + [1 - h_i(v_i)]l_i(v_i) \tag{2}$$

If there is a way to make an auction with an ROFR clause maximize joint expected surplus of the seller and the right-holder, both equations (1) and (2) must hold for all $i > 1$. But we know that, for those bidders, we must have

$$h_i(v_i) = F_1(J_i(v_i)) \prod_{j\neq i, j>1} F_j(J_j^{-1}(J_i(v_i)))$$

[6]Note as well that in our simplified setting the object is always awarded to some bidder, since the favored bidder's valuation cannot be negative.

If, as is most usual, only the bidder that gets the object pays a positive price, $l_i(v_i) = 0$ for all i, v_i. Then, it is clear that, since

$$\int_0^{v_i} h_i(s)ds \neq h_i(v_i)\frac{1 - F_i(v_i)}{f_i(v_i)}$$

equations (1) and (2) cannot be satisfied at the same time. So it follows that no standard auction with an ROFR clause can achieve joint surplus maximization.

If $l_i(v_i) \neq 0$ for some i, v_i, from (1) and (2) we have

$$U_i(v_i) = \int_0^{v_i} h_i(s)ds = h_i(v_i)\frac{1 - F_i(v_i)}{f_i(v_i)} - [1 - h_i(v_i)]l_i(v_i)$$

for all $i > 1$. Evaluating this expression at $v_i = \overline{v}$, we conclude that $U_i(\overline{v}) = 0$, which is absurd.

Hence, no auction with an ROFR clause maximizes the sum of the utility of the seller and the favored bidder. The intuition is clear. Obtaining the payment scheme that maximizes joint surplus determines the allocation rule and the expected payment of each bidder conditional on her valuation. Having an ROFR clause that satisfies joint surplus maximization, if it were achievable, would force each nonfavored bidder to pay her own virtual valuation when winning, which does not coincide with the payment rule determined by the allocation rule and incentive compatibility.

Many mechanisms implement the allocation that maximizes joint surplus, although they are necessarily more complex than adding an ROFR clause to a standard auction. For instance, the seller could ask the favored bidder to announce her valuation (either directly or by making a bid), and then conduct an English auction among unfavored bidders, with individual reserve prices set in such a way that only bidders whose virtual valuation exceeds the favored bidder's actual valuation decide to participate. The favored bidder's expected payment, of course, should follow from incentive compatibility. Alternatively, the seller could run a first -or second- price auction with an adequately chosen advantage for the favored bidder: she would lose only if a rival's bid were higher than hers by a margin that reveals that the rival's virtual valuation exceeds her actual one.

To conclude, let us note that our result on the suboptimality of ROFR clauses reinforces the conclusions in Bikhchandani et al. (2005). ROFR clauses should be explained by reasons beyond the simple one-time interaction between the seller and a favored buyer, and should not be awarded lightly by sellers.

References

[1] Bikhchandani, S., S. Lippman and R. Ryan (2005) "On the Right-of-first-refusal" *Advances is Theoretical Economics,* Volume 5, Issue 1, Article 4.

[2] Burguet, R. and M. Perry (2005) "Preferred Suppliers and Vertical Integration in Auction Markets," mimeo, Institut d'Analisi Economica and Rutgers University.

[3] Choi, A. (2003) "A Rent Extraction Theory of Right of First Refusal," mimeo, University of Virginia.

[4] Grosskopf, B. and A. Roth (forthcoming) "If You Are Offered the Right of First Refusal, Should You Accept? An Investigation of Contract Design" *Games and Economic Behavior*.

[5] Myerson, R. (1981) "Optimal Auction Design" *Mathematics of Operations Research*, **6**, 58-73.

[6] Naegelen, F. and M. Mougeot (1998) "Discriminatory Public Procurement Policy and Cost Reduction Incentives" *Journal of Public Economics*, **67**, 349-367.

[7] Riley, J. and W. Samuelson (1982) "Optimal Auctions" *American Economic Review*, **71**, 381-392.

[8] Walker, D. (1999) "Rethinking Rights of First Refusal" *Stanford Journal of Law, Business and Finance*, **5**, 1-58.

From: Patrick Heisinger
To: rdcrabbs@gmail.com
Cc: Housing
Subject: FW: Proposed Opportunity to Purchase Act (OPA)
Date: Monday, February 7, 2022 11:41:07 AM
Attachments: Letter - East Palo Alto City Council - 6Feb2021.pdf

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Mr. Crabbs,

I appreciate your email. I have forwarded your email and letter to housing staff who will include the correspondence in the public record.

Thank you.

Patrick

From: rdcrabbs <rdcrabbs@gmail.com>
Date: Monday, February 7, 2022 at 11:30 AM
To: Patrick Heisinger <pheisinger@cityofepa.org>
Subject: Proposed Opportunity to Purchase Act (OPA)

Hello Mr. Heisinger,

Thank you for your service to our town as assistant city manager. My wife and I have been residents of EPA since 2019 and have grown to love this community.

We want to express our deep concerns over recent proposals to enact an Opportunity to Purchase Act here in town. We believe that an OPA – though well-intentioned – will not deliver the desired results of affordable housing, and instead will adversely impact other aspects of life here in EPA.

We want to preserve the people in the town, while also pushing its infrastructure forward. Mortgage assistance, Section 8 housing, and financial education programs are all more effective ways to improve housing affordability & stability.

Thank you,
Robert Crabbs

From:	No Opa
To:	Antonio D. Lopez; Regina Wallace-Jones; Lisa Yarbrough-Gauthier; Carlos Romero; Jaime Fontes; Patrick Heisinger; Housing; Rachel Horst; Ruben Abrica
Subject:	San Francisco a Lesson in What Not to Do
Date:	Wednesday, February 16, 2022 6:26:40 AM

At least one councilmember has pointed to OPA efforts in San Francisco as evidence that East Palo Alto is on the right course in adopting OPA. The public on more than one occasion has told you San Francisco government is actually a shining example of what not to do. Just yesterday I saw community members on television with signs that said, "Don't San Francisco My Neighborhood."

Well, yesterday, the issue went to the voters [the issue being how well is my elected official doing what he or she is supposed to be doing instead of doing what he or she wants to do in between election cycles] and the numbers came back at around 75% in favor of recalling recalcitrant elected officials who went off of their own agenda and not that of their constituents. Remember, this is a representative government, meaning you're supposed to do what your constituents want, you're not supposed to use your term as an immunity idol that allows you to do all the things you want as an individual until your immunity wears off at election time. That's actually an abuse of the system.

So here's what happened, the electeds that pointed to the recall as a waste of money were shown the door. Your job as the city is to provide the essentials, clean streets, lighting, trash pickup, police and other basics. East Palo Alto has yet to deliver on the basics. Here's a quick quote from this morning's paper which hopefully you'll find useful. Maybe you should run a well-run city above all else. Vote no on OPA.

"The voters of this City have delivered a clear message that the School Board must focus on the essentials of delivering a well-run school system above all else," said San Francisco Mayor London Breed, who supported the recall, in a statement. "San Francisco is a city that believes in the value of big ideas, but those ideas must be built on the foundation of a government that does the essentials well."

From:	Luis J. Guzmán
To:	Carlos Romero; Ruben Abrica; Lisa Yarbrough-Gauthier; Antonio D. Lopez; Regina Wallace-Jones; Jaime Fontes; Rafael Alvarado; Patrick Heisinger; Rachel Horst; cityclerk; Housing
Subject:	01 March 2022 - OPA East Palo Alto city council ordinance topic
Date:	Thursday, February 24, 2022 9:03:03 PM

Dear city council members and city staff,

I very much appreciate that the city is looking at all the tools to prevent and mitigate displacement for our diverse and most vulnerable constituents. However, this ordinance has much greater risks than benefit ratio for all our residents. Overall, this measure negatively impacts the investment long term residents have made in our city, penalize them and control their generational wealth.

Beside negatively impacting the free market and the investment long term residents have made in our city, which they should be able to dispose of as they wish, this ordinance could also well accelerate displacement by forcing out existing renters and putting stronger scrutiny on prospective renters.

As we know from the recent mortgage, financial and sanitary crises, things can change very quickly and take a turn for the worse. One can be exempt today but may need to move out unexpectedly and need to comply tomorrow with the bureaucratic process.

This ordinance also exposes the city to many unknow litigations which we are not prepared for nor we can afford.

Why would an EPA resident who has 5 houses in EPA be exempt while a Belle Haven resident with one house in EPA be unfairly burdened with this ordinance? You do not help a few families by discriminating against hundreds penalizing and controlling generational wealth.

Please vote no on OPA.

Regards,

Luis Guzman
East Palo Alto resident

From:	Terri Vines
To:	Carlos Romero; Ruben Abrica; Lisa Yarbrough-Gauthier; Antonio D. Lopez; Regina Wallace-Jones; Housing; Jaime Fontes; Rafael Alvarado; Patrick Heisinger; Rachel Horst
Subject:	Vines OPA Opposition Letter to EPA Council and Staff
Date:	Friday, February 25, 2022 3:25:05 PM
Attachments:	image.png

Dear East Palo Alto City Council Members and Staff:

As long-time residents of East Palo Alto, we wish to register with you our opposition to the OPA ordinance, as it is currently constituted. We are in concert with the City's laudable goals of preventing displacement, promoting community stability, a pathway to home ownership, and a mechanism to keep rental housing affordable. However, as constituted, OPA does not achieve these goals. Instead, it creates an untenable situation for tenants, non-profits, and the City. It attacks the integrity of homeowners by assuming homeowners might violate its tenets.

As noted in the background material that follows, there are significant hidden costs to be borne by homeowners throughout the OPA process. Additionally, tenants under OPA, are tasked with trying to determine who's on first. There is no clarity or prioritizing of which tenant has ROFO, nor is there clarity regarding the enforcement of any existing lease or rental agreement. This will leave tenants to fend for themselves without support, which will be disastrous.

Whereas OPA recognizes that most tenants are without the means necessary to take advantage of ROFO and ROFR, there are groups of tenants well positioned to take full advantage of OPA. This tenant group consist of tech employees, university students, and persons relocated by the federal government, thus increasing the likelihood of accelerating gentrification under OPA.

As previously stated, homeowners are not treated fairly under OPA as they are threatened with fines, penalties and prosecution. Please be mindful that, "without the home which the homeowner provides, there is no OPA."

After a careful read of OPA as constituted, two scenarios are provided as background material entitled Before OPA and Under OPA. The Before OPA scenario highlights an actual situation experienced by a homeowners association with a non-EPA resident owner and his tenants. For comparison purposes, relevant OPA sections for non-resident owners and tenants were applied to reflect the Under OPA scenario. This is followed by a series of questions with a diagram to show the ratio of resident to non-resident homeowners along a half-block corridor of Runnymede Street. The results are compelling. We ask your thoughtful reading, assessment of the scenarios and questions, and community impact.

Before OPA Actual Scenario

- Non-resident owner bought a $1.15M single family dwelling within HOA
- Owner leased home to family of 5 (Leasee)
- Leasee sub-rented rooms and mattresses to 15 subtenants
  - Lease is broken
- Owner incurred $26K in damages to home, CC&R fines, and legal fees
- Leasee given 90 days to move
  - Owner grants a 60-day extension

- Leasee unsuccessfully sought displacement settlement then stops paying rent
- Owner Incurred a total of $41K in expense

After five months tenants moved, owner made repairs and sold home within 4 weeks for profit

Under OPA

- Non-resident owner owns single family dwelling with HOA fees and CC&Rs
  - Leases home to family of 5 who sub-rents rooms and mattresses to 15 subtenants
    - Lease is broken (Does OPA supersede terms and conditions of lease?)

Owner incurs $26K in damages to home, CC&R fines, and legal fees

- Owner decides to sell home
  - Tenant is OPA eligible, but who is the tenant?
    - OPA tenant definition is unclear as to who the eligible tenant is: ***"****renter, tenant, subtenant, lessee or sublessee of a rental unit, or successor to a renter's interest, or any group of tenants, subtenants, lessees, or sublessees of any rental unit, or any other person entitled to the use or occupancy of such rental unit.****"***
  - Owner required to submit *Intent to Sell Notice* to PEP 30 days before listing or marketing home
  - Tenant responds with *Statement of Interest* within 15 days or Assigns Rights to QNP or City
    - Owner required to submit a *Disclosure Package* within 5 days
      - PEP review process extended 30 days; owner prohibited from listing or marketing home
- Intent to Sell ➔ Statement of Interest response ➔ process review extension is ~75 days
  - Tenant or PEP submits Right of First Offer to owner
    - OPA Contract Negotiations (14.26.110.C-E) and Prohibited Conduct (14.26.130) restrict owner's dialogue with PEP
      - "…Owner may not require PEP to prove financial ability to perform as a prerequisite to entering into a contract."
- ROFR process compels non-resident owner to hire a real estate attorney
- No incentive, or requirement of Tenant to continue paying rent during ROFO/ROFR process
  - "… any Tenant who resides in any unit at the time of the sale of a Residential Property under this Chapter [14.26.120], shall not be subject to eviction based on their failure to meet income restrictions or other eligibility requirements imposed by this Section."
    - OPA does not require tenant to be in 'good standing' as a ROFO and ROFR pre-requisite
- If Tenant is a Subsidized Purchaser:
  - Tenant or PEP required to sign and submit an initial Statement of Rights and Obligations designating property as "permanently affordable", i.e., for 99yrs. (14.26.120 A1-2 and D)."
    - *"Nothing in this provision commits the City Council to providing a specified level of funding for the acquisition of Residential Property under [OPA]."*
    - Who subsidizes the tenant-purchaser? What is the role of EPACANDO and who funds them?

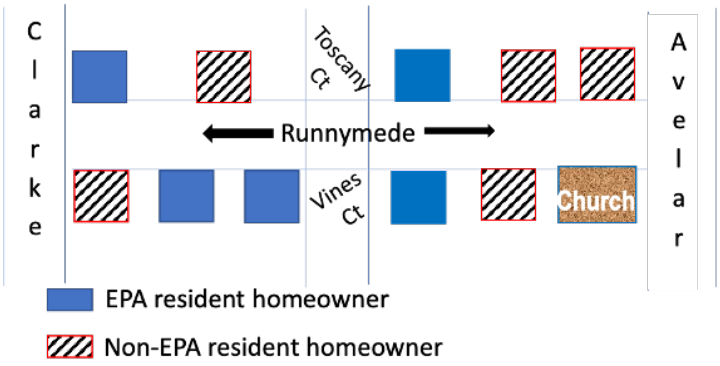
- Owner sells home "As Is"
    - Incurs financial loss; unrepaired damages reduce home value
    - Real estate attorney needed to ensure owner complies with OPA requirements else risk penalty of perjury, fine, or rescinding of sale
        - "*By no later than thirty (30) days after any sale, the Owner(s) must record with the San Mateo County's Recorder's Office a signed declaration, under penalty of perjury, affirming that the Sale of that Property substantially complied with the requirements of the Ordinance… A prevailing party in any action to enforce this Ordinance is entitled to civil damages and damages according to proof and reasonable attorneys' fees and costs. Also, a court may order that any transfer or sale of property made without complying with the requirements of the Ordinance be rescinded…"*
            - What is meant by "*substantially complied?"*
    - OPA Administrative Guidelines have yet to be writtin: "The City Council shall adopt Administrative Guidelines necessary to implement the requirements of OPA and may adopt additional rules and guidelines for purposes of administering OPA." 14.26.170

- HOA must continue to deal with, and incur legal fees, of Tenant who were repeatedly in violation of CC&Rs.
    - If home is a subsidized purchase, Tenant must agree "to reside at the Residential Property at least 3 years."

Additional OPA Questions

- How will RoFR benefit the tenant to become a homeowner and not a tenant to a QNP?
- What and who will be the Tenant's funding source for Purchase Subsidy given the City absolves itself of providing Tenant a "specified level of funding for the acquisition of residential property…?"
- OPA defines Tenant as a "renter, tenant, subtenant, lessee or sublessee of a rental unit, or successor to a renter's interest, or any group of tenants, subtenants, lessees, or sublessees of any rental unit, or any other person entitled to the use or occupancy of such rental unit."
    - Absent is a tenant in 'good standing' clause based on California/21-CCR-Sec-1476, i.e., "a condition when tenants or occupants who are current in rent obligations, and in full compliance with the terms and conditions of the lease or rental agreement …"
        - Owner should be able to disclaim any tenant right under a lease (rental agreement) if not in good standing which should make Potential Eligible Purchasers ineligible to purchase property (14.26.070.5-6)

The following diagram is a ½ block section of Runnymede.



* From the diagram, four homes are owned by non-EPA residents, three of which are historically rented to tech
employees, university grad students, and persons relocated by the federal government. Each group qualifies to
purchase homes without subsidy therefore how will their ability to purchase stall gentrification?

* If the four homes were to be purchased under OPA Purchase Subsidy, what would be the impact of home values
on homes owned by EPA residents? Specifically:

- If a PEP receives a Purchase Subsidy, who will own the land?
- What will be the role of EPACANDO under OPA?
- How will the 99 years of "permanent affordability" standards not impact the home value?
- Homeowners will require a real estate attorney to sell home consistent with OPA requirements
- Shouldn't OPA Administrative Guidelines be made available before voting on the ordinance so that
homeowners are fully aware and informed of requirements?

We again ask your thoughtful read of our questions and concerns. Please be assured we are in full support of affordable housing. However, OPA is not the amenable pathway to achieve as the rights of homeowners must be part of the solution.

Respectfully submitted,

Bill and Terri Vines, EPA Residents Opposed to OPA

From:	Marcelline Combs
To:	Carlos Romero; Ruben Abrica; Lisa Yarbrough-Gauthier; Antonio D. Lopez; Regina Wallace-Jones
Cc:	Housing; Jaime Fontes; ralvaarado@cityofepa.org; Patrick Heisinger; Rachel Horst
Subject:	Opportunity to Purchase Act (OPA)
Date:	Saturday, February 26, 2022 3:37:38 PM

February 24,2022

Dear Council Members,

This letter is to address the Opportunity to Purchase Act (OPA) being discussed broadly in our community as a way to resolve the housing issues. My husband and I are resident homeowners and have attended several virtual meetings regarding this ordinance to gain a better understanding of its purpose and how it would help our city overall.

After much discussion we believe that OPA will hurt homeowners, renters, and the City of East Palo Alto. We also believe there is a serious transparency issue because clear information about OPA was not provided to the majority of homeowners, there was no financial impact analysis provided, and it is unclear who is actually funding this initiative.

Therefore, we are asking that you vote NO on OPA.

Respectfully,

Steven & Marcelline Combs

From: tet p
To: Carlos Romero; Jaime Fontes; rabrica@citofepa.org; Lisa Yarbrough-Gauthier; Antonio D. Lopez; Regina Wallace-Jones; Housing; Rafael Alvarado; Patrick Heisinger; Rachel Horst
Cc: tet_p@yahoo.com; Martin Peralta; Maylene Peralta
Subject: Input On OPA EPA
Date: Saturday, February 26, 2022 6:52:19 PM

Dear East Palo Alto City Council and Staff,

I am an EPA resident and single-family homeowner since 2004. I am writing to express my disapproval of the proposed OPA Ordinance. I read up as much as I can on both sides of the issue and I only find "cons" as opposed to "pros" for homeowners. It is not balanced but a very one-sided argument. I hope that the powers that be who will decide will weigh-in and consider the plight of homeowners.

I am now retired (with disability) and very concerned about my home equity and security if OPA is implemented. Most of my family lives in the Sacramento area (Roseville, Rocklin, Natomas, Yuba City, etc), so an option for me is to live closer to them and perhaps rent out my EPA home in the future. Some folks are invested in owning rental properties to supplement their retirement income.

Please allow me to provide my input:

<!--[if !supportLists]-->● <!--[endif]-->Let the “free” Real Estate Market prevail; sometimes it is the buyer’s, and sometimes, the seller’s market. The market (real estate, stock, etc) always balances itself anyway.

<!--[if !supportLists]-->● <!--[endif]-->OPA, it seems to me, is manipulative, disruptive, bureaucratic, and will ruin progress for EPA, which is currently attractive to prospective home buyers.

● <!--[endif]-->Regarding the Non-Profit Organization (tax-free)….where would their funds come from to help out PEPs and guarantee financing of home loans?

Please hire an unbiased and local expert / consultant to conduct EPA market analysis. Thank you for this opportunity.

Sincerely,

Frances Peralta

From: Anna Romanovskaia
To: Housing
Subject: EPA resident and homeowner opposing OPA EPA
Date: Sunday, February 27, 2022 10:50:35 PM

Hello,

My name is Anna Romanovskaia and I am an EPA resident and a homeowner.

I am strongly opposing OPA and wanted to share my thoughts with you.

There are many concerns and questions regarding OPA:

- As single family homes are expensive and a city will not be able to subsidise many families, so only a few families (about 5 families) a year will be benefited - so OPA is not a tool against displacement.
- EPA city still has not done a proper economic analysis on the possible OPA outcomes for the city and the residents. The study that was presented by the city was done by a remote real estate professional who is not aware of the local EPA/Bay Area real estate market. Also, that study does not seem valid as many of the points presented by the hired specialist are contradictory to the research/studies that were done before and can be easily found online. E.g. The hired expert said that OPA and POFR will not affect the real estate market and will not drive house prices down for ALL the homeowners. But this claim simply is not true as many of the studies on the subject suggest. Looks like the study was done only to pacify the residents-homeowners so OPA can pass. The fact is that 2 third of the homeowners are the EPA residents, so they will be punished by lowered house prices.
- OPA is costly for the city - city (resources, city budget) and the residents - EPA homeowners.
- There is nothing that prevents tenants or nonprofits from buying homes on the market right now. Why do we need OPA in the first place?
- Largely only non-profits will become players on the EPA real estate market and will be benefited when house prices inevitably will go down, not the displaced families.
- If OPA will pass, absentee investors will be selling their houses. As the tenants are not able to afford the houses, many houses will be purchased by facebook, google etc tech workers. This means that rental supply in EPA will go down so the tenants will indeed be displaced at the higher rate.
- OPA for single-family houses is not proven effective in the U.S. While Washington D.C. tried, they cancelled it, because it was not successful but rather harmful. Why is the city doing the experiment while resources are so scarce?
- As a lot of community members and homeowners are against the OPA, if the OPA ordinance passes, the city will be sued. Does the city take this into account and does the city have resources to engage in legally defending OPA?
- Why is the city so concentrated on this contradictory law that brings so much division into a community, so much pushback from the homeowners, so costly for the city and benefits few (5?) families a year. Shouldn't the city instead spend its resources wisely and look at other displacement solutions which will actually benefit the people that are being displaced: multi-story affordable housing, increasing wages, strengthening schools in EPA, supporting local businesses?

I hope the City Council will vote NO on the OPA ordinance and look at the other solutions for

displacement that are proven to be effective.

Regards,
Anna Romanovskaia

From: Gary Li
To: Regina Wallace-Jones; Lisa Yarbrough-Gauthier; Carlos Romero; Antonio D. Lopez; Ruben Abrica; Patrick Heisinger; Rachel Horst; Rafael Alvarado
Subject: Re: Please postpone the EPA OPA
Date: Monday, February 28, 2022 10:40:08 AM

Sorry, the vice mayor I mentioned in previous email was Mr Carlos Romero at the last OPA meeting.

On Mon, Feb 28, 2022, 10:21 AM Gary Li <garylimobile@gmail.com> wrote:

> Dear city officials,
>
> As presented in the last meeting, about 37% EPA homes are owned by investors. So it is safe to assume about 30% house bidders are investors currently. OPA will discourage any investors from bidding for EPA houses in the coming years. So, with 30% less buyers in the future, how much do you think the house prices will drop?
>
> Vice mayor mentioned in several meetings about his hatred of the investors. After 2008, investors came in, spent hard earned money and made the houses livable. Because the house prices went up, the Vice mayor sees investors as blood suckers, what if the prices went down after 2008, the investors will be seen as mother Terasa?
>
> God forbid, suppose in the future house prices went down then OPA would not help people build equity, would the city council pass another ordinance to attract investors?
>
> Wealth is earned not handed to.
>
> Please vote no on OPA.
>
> Gary, EPA homeowner

From: Patrick Heisinger
To: Housing
Subject: FW: NO on OPA
Date: Monday, February 28, 2022 12:55:38 PM

From: Imani Lea Brown <imanilea@gmail.com>
Date: Monday, February 28, 2022 at 12:52 PM
To: Carlos Romero <cromero@cityofepa.org>, Ruben Abrica <rabrica@cityofepa.org>, Lisa Yarbrough-Gauthier <lgauthier@cityofepa.org>, "Antonio D. Lopez" <alopez@cityofepa.org>, Regina Wallace-Jones <rwallacejones@cityofepa.org>, cityclerk <cityclerk@cityofepa.org>, Jaime Fontes <jfontes@cityofepa.org>, Rafael Alvarado <ralvarado@cityofepa.org>, Patrick Heisinger <pheisinger@cityofepa.org>, Rachel Horst <rhorst@cityofepa.org>
Subject: NO on OPA

In advance of the vote tomorrow, I would like to reinforce my opposition of the OPA ordinance. Please don't discount the potential economic risks imposed by this ordinance in favor of idealistic hopes for the city. Please re-focus to work with homeowners, absentee and present, investors, and the non-profit organizations to implement policies for realistic change.

And yes, Mr. Romero, you can look me up all you'd like on your list. I am an absentee owner. However, you don't know that my family lives in my home and I provide affordable housing to a single mother with 4 children. You don't know the circumstances that drive people to do what they need to do with their homes, and your invasive list can't tell you our stories. That is part of the many problems with your insulting and mean-spirited assumptions, as well as with this ordinance.

I sincerely hope that this council will vote NO.

Thank you.

On Wed, Dec 1, 2021 at 9:14 PM Imani Lea Brown <imanilea@gmail.com> wrote:

> To the mayor, city council, and city staff
>
> I am writing to voice my opposition to the OPA ordinance.
>
> I am also one of the homeowners that has started the process of building an ADU, encouraged by the city, only to now discover that this ordinance can drastically and negatively impact my investment. It has already been an unsettling process, and now I cannot even have the confidence that I will have reliable leverage if I make the investment. The elements of the ordinance that discourage homeowners like myself who were planning to build, go in direct opposition to the stated goals of the ordinance.
>
> EPA has no mainstream banks, no mainstream grocery stores, limited sidewalks, failing infrastructure, no ability to enforce the existing codes, no control of the fireworks and bombs going off year-round, every street has failing sewer lines, traffic is atrocious, the street sweepers and parking enforcement show up on an unpredictable

schedule... Yet this is the focus? It has a far-fetched hope of helping a handful of tenants, if any, buy homes. It is appalling that the city has taken this on while so many of these other issues remain.

I sat in on all three-plus hours of the meeting on Wednesday evening, and the points made by concerned homeowners are overwhelmingly accurate and relevant. If the city decides to push this through in light of all of the concerns, it will be crystal clear that the city's objectives are not in the best interest of the entire community.

If the city wants to help mitigate displacement, encourage homeownership, and help with affordable housing it should put time and effort into financial literacy, education, and job readiness initiatives. Fix the community from the inside out and do not place this strain on the good people who are just trying to make a way for their families.

The city has no place in real estate transactions, and like many others, I am at a loss as to how this ordinance does not violate the fundamental rights of your residents.

Thank you.
Imani Lea Brown
East Palo Alto Homeowner
Resident since 1983

--

_____
Imani Lea Brown
510-326-5761
imanilea@gmail.com

From: Abhay Vardhan
To: Rachel Horst
Subject: No to TOPA and COPA
Date: Monday, February 28, 2022 5:47:35 PM

Hi Rachel

I am a homeowner in East Palo Alto and continue to oppose TOPA and COPA. While I sympathize with the need to keep housing affordable, the ordinance proposals seem quite invasive to home owners' rights and introduce a lot of red tape for selling my home at a later date. Further, by city's own estimates, only about 10 houses per year are likely to be eligible under this ordinance so it is not going to make much of a difference for making housing affordable.

I believe that this ordinance is bad for our city and community.

thanks
Abhay

From: Jeanne Jeanne
To: Ruben Abrica; Lisa Yarbrough-Gauthier; Carlos Romero; Antonio D. Lopez; Regina Wallace-Jones
Cc: Housing; cityclerk
Subject: EPA OPA
Date: Monday, February 28, 2022 7:28:01 PM

Dear EPA City Council Members,

Thank you for reflecting and gathering more data/research these past few weeks. Again, I am a single family home owner who lives in my house in EPA. I don't own any other property in EPA. I oppose OPA.

During the last meeting, a large portion of the debate was around Right of First Refusal. One of the arguments from the consultant was that there is no research that shows that RoFR might be damaging to house prices. However, we have heard from so many professionals in real estate and even a UCLA economics professor, that RoFR would indeed be damaging. Here is one data point from me. Several years ago, I was in the market to buy a house. I ended up buying the house that I live in right now. However, I was not and am not some rich investor or evil landlord. I do not have the ability to aggressively outbid others. If at the time, there was a house up for sale under OPA, I would have avoided it. I would not have wanted to put all the time, energy, and emotional investment into a house that could potentially get matched and snatched by a non-profit. I'm sure many other people would think the same way. Therefore, if people were to avoid an OPA house, there would be less buyer competition thus dampening the potential selling price of the house.

Second, one of the arguments is that OPA will not really affect landlords selling. Now that I am a homeowner, should something happen in my life that I need to move out, I would want to rent out the house temporarily or leave it vacant temporarily while making big life decisions, like whether or not to sell. Should I sell, I would still be owing mortgage on the house, but with the prolonged timeline of RoFR and the non-profits making an offer, I would lose months of mortgage while waiting to see if a non-profit would successfully buy my house. This is a lot of money for me with a big impact.

Finally, I have heard and read comments about how EPA residents (like me) are saying that we would recall a city council member if they vote yes on OPA. For me this is not meant to be some sort of battle cry. The reason I would vote for recall should a city council member votes yes on OPA, is because I have become severely worried about their ability to make decisions. I would be fearful of whatever other decisions they make about the city that would impact citizens. And I would not want to see what would happen to the future of EPA should they stay.

As I have emailed before, while the processing of OPA has been unpleasant, I appreciate that it has brought our community together, as in getting to know each other and communicating

more readily. I appreciate learning about local government, and I intend to get more involved and more knowledgeable. I have learned a lot about people's character. Ms. Gauthier, thank you for listening and responding during community zoom meetings with Carol Cunningham, even though you had personal responsibilities to attend to. At a city council meeting, I heard you bring up some of my specific concerns that I had voiced to you. Wow, thank you for truly listening! Mr. Lopez, thank you also for attending one of those meetings and truly thinking from all perspectives. I read your opinion piece in the Daily Post, and thank you for truly weighing everything and listening. Also, I finally met your dad, and he is awesome! Ms. Wallace Jones, thank you for your analytical and logical approach towards problem solving. I truly appreciate it, since I teach logical problem solving to my students in math, computer science, and engineering. Mr. Abrica, thank you also for attending one of those zoom meetings. And it is good to see you at rEPAct, learning those radios together.

Best regards,
Jeanne Yu

From:	Sheng Jiang
To:	Antonio D. Lopez; Carlos Romero; Jaime Fontes; Lisa Yarbrough-Gauthier; Patrick Heisinger; Ruben Abrica; Rafael Alvarado; Rachel Horst; Regina Wallace-Jones
Subject:	Please vote No to EPA OPA
Date:	Tuesday, March 1, 2022 10:43:35 AM

Hi city council members and staff,

I'm a resident homeowner in East Palo Alto. The right of first refusal will absolutely hurt all current and future homeowners in East Palo Alto. From economics 101, the price is where supply meets demand. As mentioned before supply in East Palo Alto is limited. As a result, prices in East Palo Alto are driven purely by demand.

However, demand will be driven down for all home sales exempt or not. Let's start with non exempt owners. Potential buyers aka demand would be driven away because the right of first refusal can supersede any offer without any recourse. The potential buyer is essentially bidding against themselves. So why would a buyer bother with this when they are at a disadvantage? This will drop demand.

Demand for exempt homeowners homes will also drop because the right of first refusal will drive away anyone who wants a property to rent out since that would make the property non exempt in a future sale. Since demand will drop, house prices in East Palo Alto will also drop.

East Palo Alto will hurt all homeowners for only 3 to 5 homes a year. That's absurd! Why can't tenants and non profits make offers on the open market? Where are the examples where the right of first refusal changes the outcomes?

Let's prevent displacement by building more housing, bringing in more opportunities, and providing assistance to prospective buyers. Let's pull people up instead of dragging homeowners down. Please vote no to OPA.

Thanks,
Sheng

From:	Carol Cunningham
To:	Ruben Abrica; Lisa Yarbrough-Gauthier; Regina Wallace-Jones; Antonio D. Lopez; Carlos Romero
Cc:	Housing; Jaime Fontes; Patrick Heisinger; Rachel Horst
Subject:	Feedback on Latest OPA/RoFR Staff Report
Date:	Tuesday, March 1, 2022 11:46:12 AM

Dear East Palo Alto City Council,

I just finished reviewing the latest Staff report on OPA/RoFR and have the following feedback. However, I will not belabor the points that I've already documented extensively in past emails. Staff's report on market impact due to RoFR was essentially a repeat of DRA's flawed "analysis" (as previously documented) and a restatement of the operational details of RoFR, so there was **no new and relevant information/analysis presented**. Staff's references to the limited number of OPA transactions (this is the ROI issue we've raised) and that buyers will be able to "clearly identify" those listings that have a RoFR condition (this is the "Scarlet Letter"/red flag problem for sellers that we've raised) do nothing to mitigate the negative impact of OPA on home values and are actually articulating some of the key flaws with the ordinance. The issue is that 1) buyers are deterred from bidding/purchasing in EPA simply because of the **possibility** that they may be subject to OPA/RoFR now **or** when it's time to sell, even if there are zero OPA transactions that are completed in a given year, and 2) an exemption from OPA cannot be pre-determined or guaranteed as it depends on the specific tenant and/or the owner's individual circumstances when it comes time to sell, which cannot always be controlled, so anyone could fall under OPA, even if exempt today. Ultimately, the reduced demand due to these factors is what will drive down home prices.

Please also note that both of Staff's references from Washington DC are irrelevant to EPA's OPA proposal. In the paper by Jenny Reed (footnote #12), she describes the First Right Purchase program (**not TOPA/RoFR**) that provides an opportunity for **tenant associations to purchase apartment buildings**. This program includes critical financial, legal and technical support to make these purchases feasible, **but the program/funding is failing,** so she is offering her recommendations. The second paper, by Yesim Sayin Taylor, describes the DC housing market and states in the abstract that "The study finds that a significant pressure on the District's housing market is the fierce competition for larger units from affluent singles and couples." This finding does NOT apply to the EPA housing market, as I've shared with you in various forums and even provided a chart to illustrate the fragility of the EPA market. In addition, this paper is not even an analysis of TOPA or RoFR. However, the authors state: "That these policies [DOPA/TOPA] have been adopted does not mean they [have] been successful in accomplishing their stated objectives or are free of unintended consequences...The analysis presented in this study suggests that constructing more housing, especially a greater mix of housing types in high-demand areas, is necessary to relieve the pressures on the housing market."

As you prepare to deliberate/vote on OPA tonight, I wanted to share one last update related to this main concern that I and others have raised with this ordinance. One of the active Realtors in East Palo Alto and 3 homeowners have recently informed me that the real estate market is already experiencing a negative impact due to concerns around OPA, which hasn't even passed. Buyers are sitting on the fence or questioning whether they should purchase in EPA, agents are "not touching EPA" and homeowners are inquiring about selling to try and get out before a potential effective date. In fact, a prospective seller reached out to me for this reason as well, so I know there are other homeowners in the same predicament. As a final plea, please read all of the emails and attachments/links on this subject before casting your vote. **We are**

depending on you to make the right decision for the community based on the actual facts and logic that have been presented, not an emotional gamble or experiment, so please vote NO on OPA.

Thank You,

Carol Cunningham
Real Estate Professional
DRE#: 02054293
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